Principles of Physical Therapy

Edited by Japanese Physical Therapy Association

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Japanese Physical Therapy Association

Committee for Developing an Introduction to Physical Therapy

Chairperson: Kazuo Kurosawa
Members: Akira Kimura, Yasuyuki Takakura, Tadahiro Murakami
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List of Authors

Kazuto Handa	Japanese Physical Therapy Association
Toshihiro Morinaga	Professor Emeritus, Kyoto University Professor Emeritus, Shijonawate Gakuen University
Takashi Nakayama	School of Health Sciences, Tokyo University of Technology
Isao Nara	Professor Emeritus, Hiroshima University
Hiroyuki Fujisawa	Department of Rehabilitation, Faculty of Medical Science and Welfare, Tohoku Bunka Gakuen University
Michele Eisemann Shimizu	Professor Emeritus, Prefectural University of Hiroshima, University Medical Center
Hiroshi Momma	Department of Physical Therapy, Faculty of Health Sciences, Kyorin University
Tetsuya Takahashi	Department of Physical Therapy, Faculty of Health Science, Juntendo University
Yasuyoshi Asakawa	Department of Physical Therapy, Faculty of Health Sciences, Tokyo Metropolitan University
Akira Kimura	Department of Physical Therapy, Faculty of Health Science, Gunma Paz University
Shuhei Fujimoto	Shizuoka Graduate University of Public Health
Yorimitsu Furukawa	Department of Physical Therapy, Faculty of Health Sciences, Tokyo Metropolitan University
Kazuhiro Harada	Department of Physical Therapy, School of Health Science and Social Welfare, Kibi International University
Shuichi Obuchi	Digital Transformation for Aging Society Theme, Tokyo Metropolitan Institute for Geriatrics and Gerontology
Nobuko Ohsaka	Elderly Care Room, Health Care Division, Daito City
Shigeto Yamazaki	Department of Rehabilitation, Mazda Hospital, Mazda Motor Corporation
Shinichi Daikuya	Hokuriku University
Ayako Yamamoto	Department of Physical Therapy, Faculty of Nursing and Rehabilitation, Konan Women's University
Tomoe Inoue	Department of Physical Therapy, School of Medicine, Nagoya University
Hisashi Mochizuki	Department of Physical Therapy, Faculty of Health Science Technology, Bunkyo Gakuin University
Tetsuya Chiba	Department of Rehabilitation, Nissan Tamagawa Hospital
Kengo Takashima	Division of Physical Therapy, School of Rehabilitation, Faculty of Health and Social Services, Kanagawa University of Human Services

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MATERIAL

Introductory Chapter

Introduction

A “Principle” in this book title (Principles of Physical Therapy) means a “collection of basic theories” (Kojien, a Japanese dictionary). Over half a century has passed since physical therapists started working in Japan, and physical therapy has gradually evolved as a science. On the other hand, Japanese society is facing a big change. We need to fully understand historical backgrounds in order to provide physical therapy services responding to the needs of the times. However, we must remember that physical therapy is based on the “principles” or “foundations” our predecessors have developed. Without these “principles” or “foundations,” we cannot respond to changing times nor promote any development.

From the planning stage, the main purpose of this book was to provide those who wish to study physical therapy science with a textbook for beginners. Thus, this book is intended to help beginners in physical therapy properly understand the “Principles of Physical Therapy” and establish a foundation to pass on their knowledge to the next generation of physical therapists.

Physical therapy was introduced to Japan in 1965 when the “Physical Therapists and Occupational Therapists Act” (Law No. 137) was enacted; the objective of this Act is to contribute to the spread and development of medical habilitation and rehabilitation mainly introduced from Europe and America, and this Act is characterized by its incorporation of patients with motor dysfunction because therapeutic exercise is also included in the definition of physical therapy under this Act. Physical therapy was originally called electrophysical agents, utilizing resources such as physical energy in nature, and it can also be said that the original physical therapy retained traces of ancient times, including Hippocrates and the age of oriental medicine, when it was used as one of the treatment options especially for “pain or peripheral nerve injury and circulation.” In those times, physical therapy was called aftertreatment or physics.

The Act enacted in 1965 was intended to extract challenges such as pathological conditions, symptoms, and activities of daily living (ADL) on the basis of the assessment of physical therapy for specific disorders or diseases, and treatment plans were prepared to deal with these challenges as short- and long-term treatment goals. Electrophysical agents mainly used in physical therapy at the beginning are still utilized today alone or in combination with other methods, and we should not make light of them because they are conservative therapeutic approaches supporting modern medicine, including medicine and pharmacy, that has evolved since the 19th century and one of the therapeutic approaches for the activation of natural healing.

Physical therapy is likely to be hidden behind rehabilitation, making it difficult to understand and recognize the way it works, and it is one of the reasons why we planned to publish this book. Rehabilitation originally means a comprehensive system incorporating techniques and social and occupational measures to ensure that patients/clients can live alone as a human being regardless of their disabilities, and it does not solely refer to functional recovery training for movement disorder as part of medical rehabilitation (rehabilitation healthcare). Therefore, health professionals should consciously use the right words (i.e., physical therapy, occupational therapy, speech-language-hearing therapy) when providing individual treatment.

As disease structure changes, the scope of work of physical therapists also expands to include independence support in acute, recovery, and living phases and improvement of living environment as well as functioning approaches to physically handicapped children and people, and besides these services, physical therapists must be engaged in activities in areas, including health promotion,

prevention, health activities, and community rehabilitation management. Since the enactment of the Physical Therapists Act, Japan has experienced great changes in healthcare systems due to the coming of a super-aging society and changes in disease structure, and there is a growing need to provide healthcare and nursing care in familiar communities. We live in an age where the creation of publications intended to increase awareness among beginners and members of the Japanese Physical Therapy Association about the nature of physical therapists who respond to these changing times in a timely manner helps the people radically transform their image and understanding of physical therapy (therapists/science).

As mentioned above, physical therapists are primarily responsible for therapeutic exercise for physical motor dysfunction. In 2015, the American College of Sports Medicine published a thesis "Exercise as Medicine," summarizing the accumulated evidence of therapeutic exercise. The thesis deals with the accumulated evidence of therapeutic exercise for 26 chronic diseases that physical therapists often encounter, stating that exercise is an extremely effective method for reducing the risk of death and plays a big role in the "extension of healthy life expectancy." The thesis, focusing on the future of preventive physical therapy based on public health, suggests the importance of developing physical therapy from primary to secondary and to tertiary prevention. We also need to direct our attention to the development of physical therapy based on public health as seen in foreign countries.

Based on the above, we decided to re-evaluate the future prospects of physical therapists on the basis of World Physiotherapy (name changed). To encourage teachers to incorporate the "Principles of Physical Therapy" in the class of Introduction to Physical Therapy, we put the basic idea of physical therapy in order, edited it as the "Principles of Physical Therapy," organized information to summarize development (paradigm shift) of physical therapists from a public health standpoint, including community-based integrated care, disease prevention, health promotion, and school health, and incorporated the necessary information to prepare the textbook. We would like you to use it as a supplementary textbook in physical therapist training schools.

There are jobs that need to be done by physical therapists in different countries and different times. What kind of age do we live in? What are the factors behind changes in social circumstances and social demands? What type of topic should we consider and how should we carry out our duties? We hope that beginners and physical therapists will read this book and have the opportunity to share their ideas with us.

1. Current Status of Japanese Society and Future Challenges

1) Society from a demographic point of view

Japan has undergone economic development and how will its demographic structure change in the future? How will Japan at the forefront of aging societies address its relationship with Asian countries? These questions attract attention.

A population pyramid (Figure 1) visualizes the characteristics of demographic structure and is generally divided into five categories. The most primitive type of population pyramid is a pyramid shape and as civilization advances, it will change to the shape of a temple bell, an urn, a star, or a gourd. Japan had a pyramid-shaped age structure in the 1930s and a gourd-shaped structure in 1985, and now, its population pyramid is "similar to a gourd," indicating the "declining birthrate and aging" population.

Figure 2 shows trends in aging population and projection for the future made public on the website of Cabinet Office. In a society with a decreasing population, the population continues to decrease because deaths exceed births, and Japan is thought to have entered it in the latter half of the 2000s or after the 2010s.

○ As the birthrate declines and the population ages, the Japanese population pyramid (age structure) has changed from a “Mt. Fuji” shape to the current shape of a “temple bell.” It will change to the shape of an “urn” due to a continuing decline in the birthrate, and Japan will face an issue of decreased workforce in a high-mortality society in the future.

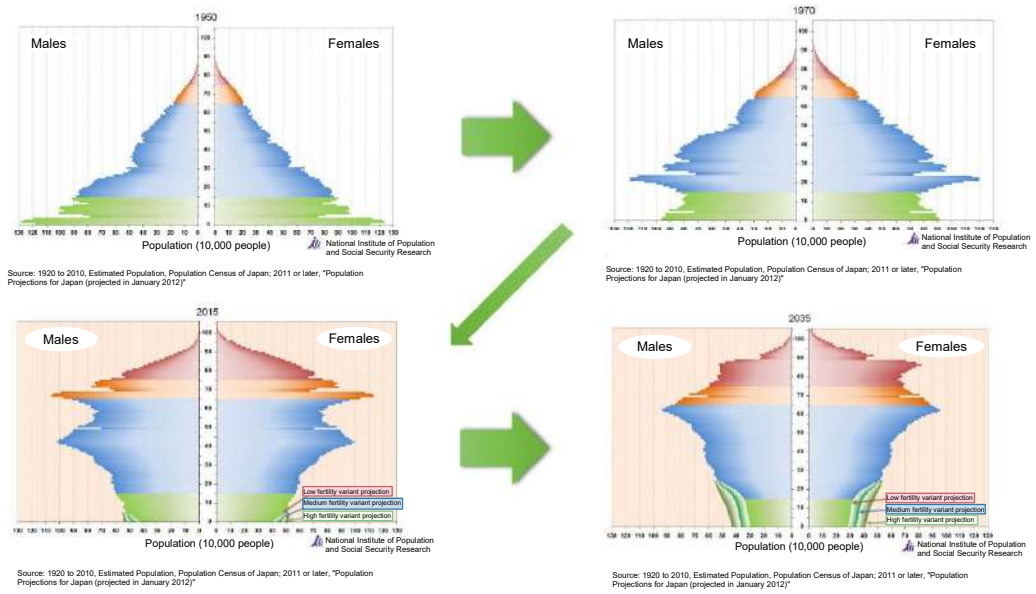
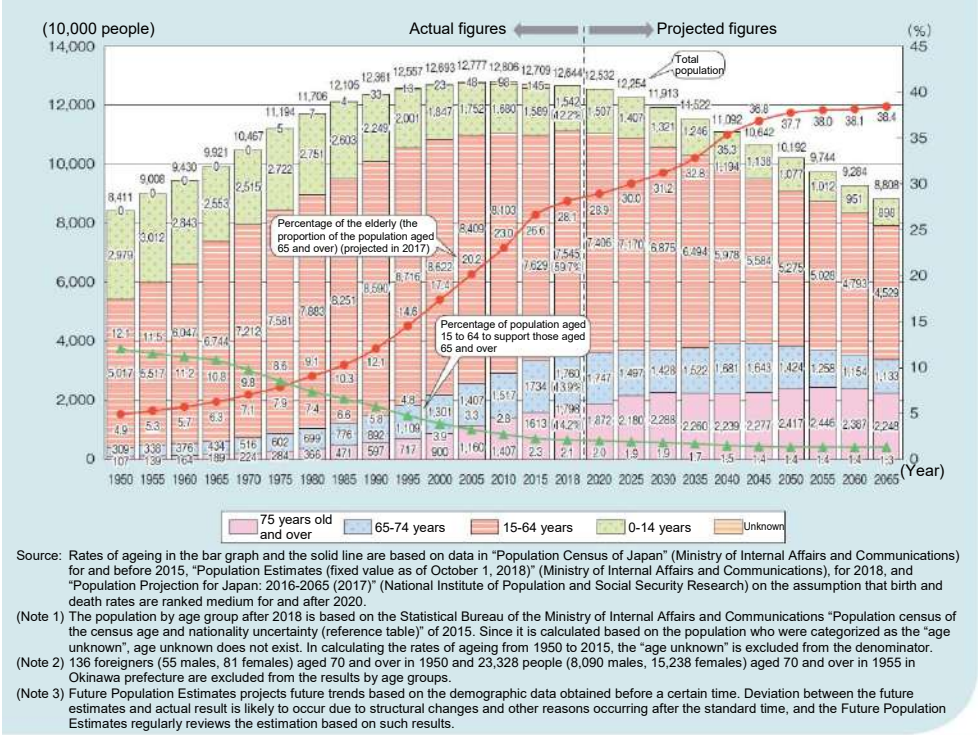


Figure 1 Changes in Population Pyramids and Projection for the Future



Source: Rates of ageing in the bar graph and the solid line are based on data in “Population Census of Japan” (Ministry of Internal Affairs and Communications) for and before 2015, “Population Estimates (fixed value as of October 1, 2018)” (Ministry of Internal Affairs and Communications), for 2018, and “Population Projection for Japan: 2016-2065 (2017)” (National Institute of Population and Social Security Research) on the assumption that birth and death rates are ranked medium for and after 2020.
(Note 1) The population by age group after 2018 is based on the Statistical Bureau of the Ministry of Internal Affairs and Communications “Population census of the census age and nationality uncertainty (reference table)” of 2015. Since it is calculated based on the population who were categorized as the “age unknown”, age unknown does not exist. In calculating the rates of ageing from 1950 to 2015, the “age unknown” is excluded from the denominator.
(Note 2) 136 foreigners (55 males, 81 females) aged 70 and over in 1950 and 23,328 people (8,090 males, 15,238 females) aged 70 and over in 1955 in Okinawa prefecture are excluded from the results by age groups.
(Note 3) Future Population Estimates projects future trends based on the demographic data obtained before a certain time. Deviation between the future estimates and actual result is likely to occur due to structural changes and other reasons occurring after the standard time, and the Future Population Estimates regularly reviews the estimation based on such results.

Figure 2 Trends in Ageing Population and Projection for the Future

Source: Chapter 1 Situation of the Ageing Population, Cabinet Office “Annual Report on the Ageing Society FY2019” (Summary)

The Japanese population will decline to about 93 million (73% of the population in 2019) by 2060. This phenomenon may have two big implications: First, the total working-age population decreases and second, the proportion of the old-old increases. The total working-age population (15 to 65 years old) started to decrease in the mid-1990s, declined to about 86 million in 2000, and is expected to decrease to about 69 million by 2030 and about 48 million by 2060. As the working-age population

decreases, improvement of working environments and health and productivity management will be issues in the future.

As for the elderly population (aged 65 and over), the proportion of the old-old will increase. The elderly population was about 22 million in 2000 and will remain almost flat (about 36 to 38 million) in and after 2020. The rate of aging will increase on a long-term basis with decreasing population size. It is inevitable that we will have an increased need for healthcare and continuing care.

2) Changes in disease structure

"Infections," such as tuberculosis, were predominant in the disease structure of Japan after the war. However, tuberculosis mortality sharply decreased in the 1950s and adult diseases (designed as aging-related diseases after 1957), including hypertension, stroke, diabetes, and heart disease, took precedence over other illnesses in the Japanese disease structure. The name of the "adult diseases" was changed to "lifestyle diseases" in and after 1996 (the Council of Public Health) and finding methods for preventing lifestyle diseases is an important policy challenge. In particular, diseases such as cancer, heart disease, and stroke account for about 60% of all deaths. We should improve our lifestyles to prevent diseases and extend a healthy lifespan (healthy life expectancy), which can be used as a future guideline.

For health measures, measures to promote the health of the people of Japan (national health improvement measures) have been taken three times every 10 years. The third set of measures, "Health Japan 21," is unique in that discussions were held to determine the measures required to prolong the period during which people can live a healthy life with good body function, or "healthy life expectancy," in a "super-aging society." To extend the healthy life expectancy, numerical targets are established by incorporating specific scientific evidence for target health management in "primary prevention," encouraging individuals to actively improve their lifestyles for prophylactic purposes. Various measures have been implemented since 2000 and since 2008, Japanese people aged 40 and over have been obliged to receive a "metabolic syndrome-specific health checkup and health guidance" that is provided on the basis of shared responsibilities among the national, local governments, and insurers such as private businesses (as we say, "metabolic syndrome screening"). To disseminate the advanced measures for prevention and health improvement taken by local governments, companies, or insurers all over the country, "NIPPON KENKO KAIGI" was organized on July 10, 2015, and specific numerical targets for 2020 were set. Verification in 2019 demonstrated great improvement in eight targets in terms of the degree of attainment and the achievement of two new targets.

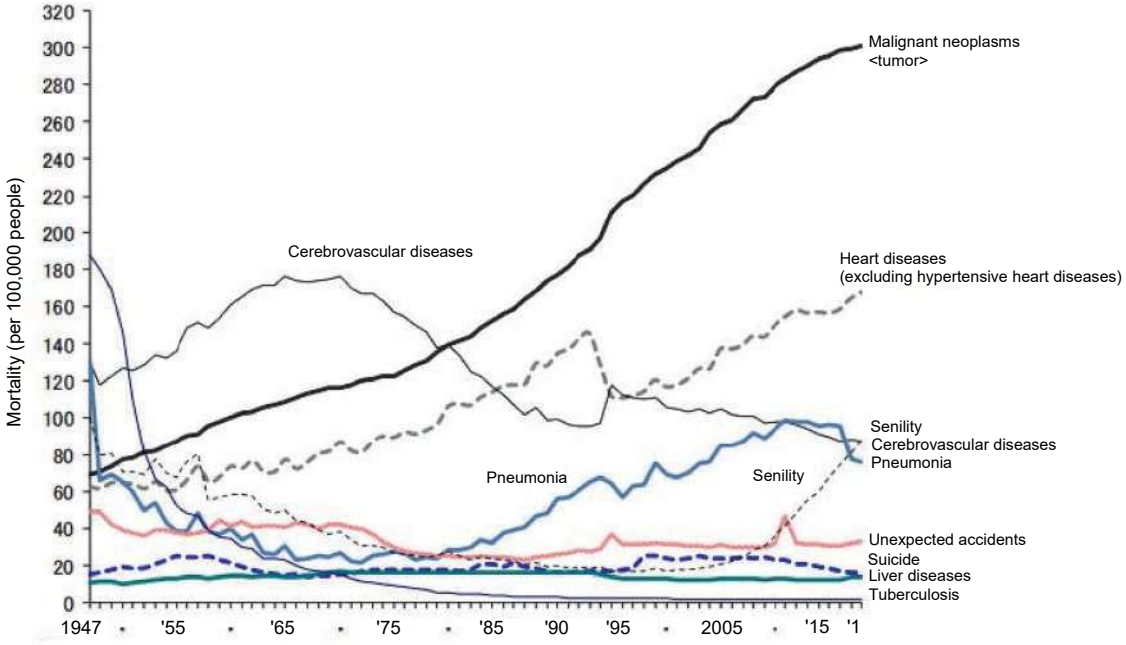


Figure 3 Trends in Mortality (per 100,000 people) for Leading Causes of Death

Source: Ministry of Health, Labour and Welfare "Monthly Report Summary of Vital Statistics (annual total; rough figures) (2018)"

Unlike the current process of an aging society where young people are becoming older slowly, elderly people will get older and the proportion of the old-old will suddenly increase in 2030. Geriatric syndromes often experienced by the old-old may interfere with returning home from acute hospitals and medical establishments with facilities for chronic inpatients. This demonstrates the fact that healthcare is inseparably related to nursing care. Geriatric syndromes refer to a series of symptoms caused by a variety of factors often observed in the elderly, and they require treatment and nursing care or care at the same time. Based on the characteristics of signs and symptoms, age, and other factors, geriatric syndromes are classified into three categories: [1] Acute disease/symptom; [2] Chronic disease/symptom; and [3] Disuse syndrome. Recent studies have shown that people with these "geriatric syndromes" such as debility, fall, and dementia, which are not illnesses, account for 40% of those requiring nursing care. The disease structure of geriatric syndromes basically consists of the same three categories in home care and health facilities for the elderly, and the frequency of geriatric syndromes that the old-old often develop is high in younger elderly populations aged 70 years in nursing care facilities. Early detection and intervention of geriatric syndromes through health checkups may be useful in preventing these symptoms, and proper evaluation of elderly functioning on a timely basis may also help figure out a good way to prevent diseases or conditions in elderly people that require nursing care.

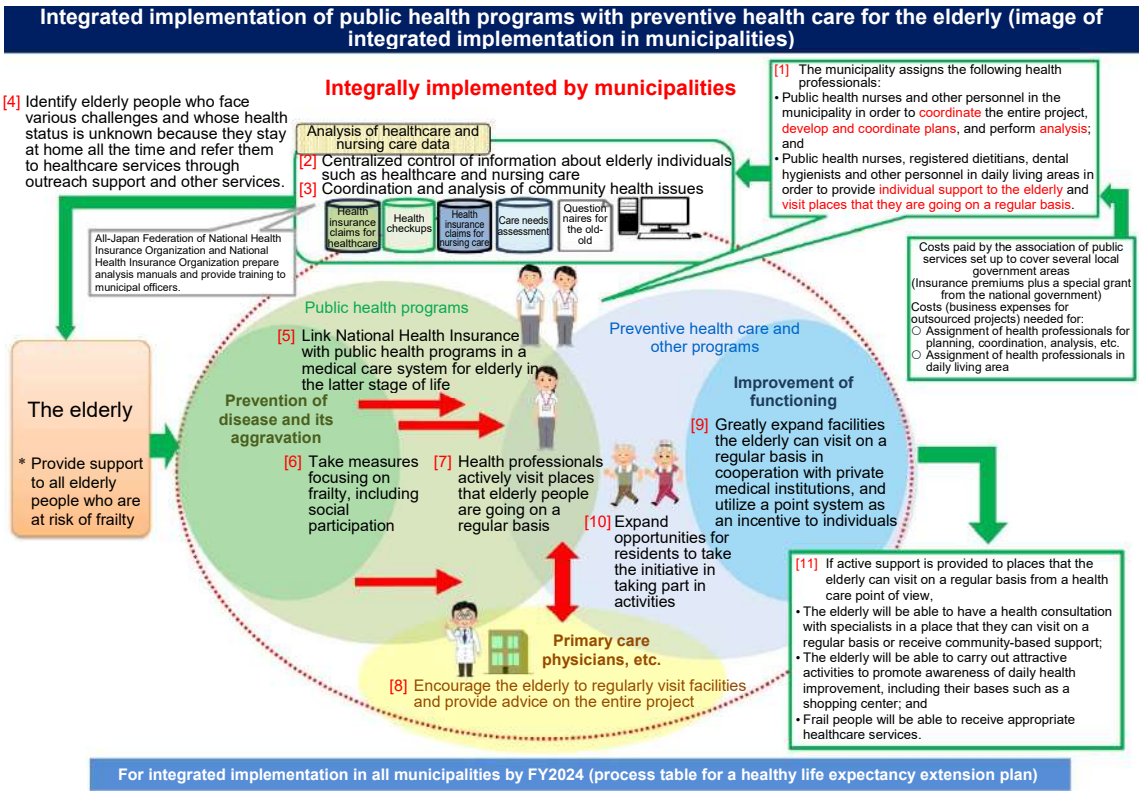
3) Issues of healthcare and nursing care

Japan is the most aging society in the world. The "baby boomers" born during the first baby boom (from 1947 to 1949) after the war will reach the age of the old-old, raising concerns about a sudden increase in social security costs for healthcare and nursing care; this issue is referred to as the "2025 problem," and "community-based integrated care system" is one of the policies primarily aiming to reduce increased social security costs. Thoughts (philosophy) on healthcare and nursing care were presented in the final report of the "National Commission on Social Security," with meetings held between January and November 2008. Then, the "National Council on Social Security System Reform" took over the thoughts on healthcare and nursing care in 2013, and various specific measures

were implemented to establish the “community-based integrated care system” until 2025. The “National Council on Social Security System Reform” spent 60% of their time discussing integrated provision of healthcare and nursing care (Figure 4). The purpose of these reforms starting in 2008 is to make better healthcare accessible to patients/clients in an appropriate location irrespective of their place of residence.

4) Ideal society Japan is trying to build in the 21st century

How will our aging society (society with a declining birthrate) change in the next 5 (2025), 15 (2035), and 25 years (2045)? There are several factors that account for a post-aging society (i.e., demographic trends, changes in disease structures, requests from the elderly due to aging, changes in circumstances surrounding the elderly and people with participation restrictions, regional and community development). Considering the above comprehensively, it is important for healthcare professionals involved in health, healthcare, and welfare to take the lead in “realizing a community-based cohesive society” where the elderly, people with participation restrictions, and healthy individuals live together for the creation of a society encouraging national participation that Japan is trying to build in the 21st century. As urgent issues, we should again discuss and carefully consider what social contribution physical therapists, healthcare staff members, should make and a plan of action in a post-aging society by taking into consideration the realization of a community-based cohesive society.



https://www.mhlw.go.jp/content/12401000/000551951.pdf
(Source: Website of Division of the Health Services System for the Elderly, Health Insurance Bureau, Ministry of Health, Labour and Welfare)

Figure 4 Integrated Implementation of Public Health Programs with Preventive Health Care for the Elderly

2. New Area of Physical Therapy Required to Meet Social Demands

The Director of the Medical Professions Division, Health Policy Bureau, Ministry of Health, Labour and Welfare sent a notification of Use of the term 'physical therapist' to Directors of Prefectural Medical Affairs Departments (Bureaus) on November 27, 2013, and the notification states that "Physical therapists sometimes carry out duties that are not considered assistance with medical treatment, such as giving guidance on fall prevention, for people without physical disabilities in a business promoting preventive health care for the elderly, and it is perfectly acceptable to use the term 'physical therapist' even when they perform duties other than physical therapy as stated above" and that "Physical therapists carrying out duties that are not considered assistance with medical treatment need no instructions from a doctor." It can be interpreted as expectations for physical therapists who would take an active part in not only preventive health care for the elderly but also in the preventive field.

Duties that are not considered assistance with medical treatment fall under the category of preventive physical therapy, potentially expanding the scope of physical therapy, and the time has come to collect more evidence. According to a report from the Japanese Physical Therapy Association's Special Committee for International Verification (May 2013), the target population of physical therapy can also be interpreted as "people who have body function and structure disorders" and "people may have such disorders" from a wider point of view and with International Classification of Functioning, Disability and Health (ICF) in mind. The purpose of physical therapy is to "increase activities, improve functioning, and promote health to support social participation," and according to the report, physical therapy options may also include "evaluation of functioning that restricts a patient's/client's activities (impairments, activity limitations, and participation restrictions), provision of therapeutic exercise, electrophysical agents, and orthotic therapy, practice of ADLs, and provision of guidance and improvement of environmental factors as needed to maintain and improve ADLs." The definition of physical therapy and physical therapist has been evaluated in specified regulations and in relation to supply and demand of physical therapists, suggesting that physical therapists are expected to expand their activities.

Public health aims to prevent disease in a community through organized social effort and prevent diseases and maintain the health of local residents. The Chartered Society of Physiotherapy, a pioneer in public health studies, is undertaking four big projects: Treatment of bone and joint diseases, management of nervous system and cardiorespiratory diseases, challenges to physical therapy, and dissemination and improvement of health education. We are entering an era in which lifestyles are improved to prevent disease or body impairment and structure deformation or displacement rather than treating disease after its onset, and physical therapists have also expanded their scope of activity from a public health point of view.

Preventive physical therapy is an academic discipline that studies body activities, including prevention of the onset and recurrence of diseases and geriatric syndromes to ensure that Japanese people can "participate in society" for a long time. Community-based physical therapy is an academic discipline that studies scientific and practical activities in the field of health and healthcare, primarily from the standpoint of livelihood support, to ensure that the elderly and people with participation restrictions and their families can continue to live in their familiar communities. Furthermore, the primary objective of industrial physical therapy relating to workers' health measures is to prevent work-related accidents and promote the health of workers.

Japan is improving community infrastructure with a view to realizing a community-based cohesive society. The role of physical therapists in disease treatment has developed in conjunction with the idea of post-war habilitation and rehabilitation. Due to the accumulated data on disease prevention and

therapeutic effects, we have entered a new stage in which health also becomes a subject in the field of health, healthcare, and welfare to encourage Japanese people to participate in society in the 21st century. The dissemination and improvement of health education among Japanese people (health literacy) is one of the four big projects for public health, and it is also a future challenge to physical therapists specialized in exercise and physical activity. The future value of physical therapists will be determined by whether they demonstrate evidence to ensure health literacy and aim in practice to make their activities vital to Japanese people.

3. Past, Present, and Future of Physical Therapists

Habilitation and rehabilitation healthcare were introduced as the third kind of healthcare. Since the enactment of the "Physical Therapists and Occupational Therapists Act" (Law No. 137) in 1965, both terms have been used frequently. The director of the hospital for which the author (Handa) worked around 1975 said, "You do not have to think about earnings at this department. You just try hard to make patients/clients understand their conditions and rehabilitate them." The author cannot forget the words. At that time, the term "plateau" was often used and whether or not the patient/client had reached a "plateau" was one of the subjects for discussion at the meeting. What was more important to us was holding a meeting with the patient/client and his/her family after he/she was found to have reached a "plateau." During the meeting, the doctor declared that the patient/client was "not expected to make any further recovery but his/her social abilities would improve greatly," and the meeting often turned into a shambles. Physical therapists changed their perspective from "Curing patients/clients" to "Encouraging patients/clients to live as people with participation restrictions."

In 1971, the then Ministry of Health and Welfare declared that "it was necessary to strengthen rehabilitation healthcare and nursing care in preparation for a future aging society." After that, rehabilitation fees increased steadily because the Japanese government increased their medical fees as a matter of policy. As a result, many hospitals and clinics suddenly started to hire more physical therapists. Training institutions also increased rapidly to meet employment needs. Naturally, newly established hospitals and clinics sought profitability and physical therapists at that time were in a dilemma between "profitability" and "principles." When the author met old acquainted physical therapists in a congress, we used to complain a lot about losing our principles. Somehow no complaints were heard. Looking back, I can see that it was still good to make a complaint.

The nursing-care insurance system introduced in 2000 is indispensable to the current aging society. However, the introduction of this nursing-care insurance system greatly affects physical therapists. Whenever the health insurance and nursing-care insurance are revised, "linking" of both types of insurance has been strongly suggested to control the nation's finances. The author suspects that because of this "linkage," physical therapists keep giving the same physical therapy aimlessly although the medical insurance was changed to the nursing-care insurance. Physical therapists should evaluate "users" properly and provide physical therapy according to the purpose.

Unlike in Europe and America, physical therapy is provided in parallel with occupational therapy from the acute phase for habilitation and rehabilitation healthcare in Japan. Every time the author (Handa) receives training in hospitals in Western countries, he feels the difference. "Physical therapists become occupational therapists." "Occupational therapists become physical therapists." It is quite natural for health professionals to clarify this issue. If the origin of physical therapists lies in the law, physical therapy options are therapeutic exercise and electrophysical agents, and the purpose of physical therapy is to restore the abilities of basic activities. Physical therapists must scientifically verify them by themselves. As a matter of course, if physical therapists are also involved in "health improvement," "prevention," and other activities, their usefulness needs to be demonstrated scientifically. The aging

society causing the increased demand for physical therapists will come to an end in the near future and we need to consider the future of physical therapists now.

(Kazuto Handa, Kazuo Kurosawa, Akira Kimura, Yasuyuki Takakura, Tadahiro Murakami, Takayoshi Saito, Keisuke Suzuki)

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Chapter 1
History of Physical Therapy (recent times)

History and Definition of Physical Therapy (physical therapy for disease, physical therapy for functioning)

What you will learn in this chapter

You will learn the definition and roles of physical therapy, looking back on the history of physical therapy (therapist) in the US, UK, and Australia.

When you study the definition, roles, and other aspects of physical therapy in Japan, it is very important for you to learn the history of physical therapy in the overseas countries that are role models for us and the history of a physical therapist's work. This will lead to knowing yourself, and you will learn the position of physical therapy (therapist) in your country. An American teacher of physical therapy who was involved in education in Japan also gave us valuable feedback about expectations for students and young physical therapists.

1. History, Definition, and Roles of Physical Therapy in Representative Countries

1) History and definition of physical therapy in the US

The American Physical Therapy Association (APTA) stipulates that entry-level (new graduate level) physical therapists should have a Bachelor's degree and complete a three-year specialized course. The APTA gives the following vision statement for the physical therapy profession after 2020 when almost all new graduates who have received education based on this new standard enter the workforce:

Physical therapy is provided by physical therapists who are doctors of physical therapy, recognized by consumers and other healthcare professionals as practitioners of choice to whom consumers have direct access for the diagnosis of impairments, activity limitations, participation restrictions, and environmental barriers related to people's function, activity, and health. We will trace the historical background to this vision and history of education.

We cannot explain the history of rehabilitation in the US without referring to war. Tracing back history, techniques in military medicine used to treat wounded soldiers during the First World War (1914 to 1918) may form a foundation for current physical therapy. In 1914, Reed College in Portland, Oregon started to provide education for Reconstruction Aids, which may also correspond to current physical therapist (PT). Women's Physical Therapeutic Association, which may be an umbrella group of the current APTA, was established by only 274 women in 1921. At that time, the term PT did not become a household word. Mary McMillan was elected the first president. The Mary McMillan Award that the APTA gives an excellent PT was named after Mary McMillan. In 1922, the first General Assembly was held in New York, with an attendance of 63 Reconstruction Aids, and the name of the Women's Physical Therapeutic Association was changed to American Physiotherapy Association (APA). From then onward, men were also allowed to join the APA. At that time, a polio epidemic spread in the US and the development of quantitative methods for evaluating the degree of polio-induced paralysis and therapeutics was an urgent issue. R. W. Lovett and his colleagues devised muscle strength testing using gravity and resistance and W. Wright published a book on manual

muscle strength testing in 1928. The systematized version of this original method is the widely-used Daniels's manual muscle strength testing. This indicates the degree of freedom of physical activities under the force of gravity and can be a very reasonable evaluation method of QOL for daily living and the quantity and quality of support and assistance. The method of applying resistance corresponds to a muscle strengthening method and it may be deeply involved in the fundamentals of physical therapy. This is why this approach is still widely used now. Likewise, Kendall, known for muscle strength testing, and S. Brunnstrom, for evaluation of coordinated movement in spastic paralysis, played an active part in roughly the same period.

From the beginning of its foundation, the APA focused on establishing standards for PT education and the medical department in some universities/colleges started to provide courses for physical therapy. In 1930, the standardized curriculum was approved by the American Medical Association (AMA). The initial curriculum included massage, therapeutic exercise, electropathy, and hydrotherapy, reflecting treatment at that time, and other methods, such as muscle strengthening and deformity correction, were added later. The reason behind this is the polio pandemic, which may also be the reason that various therapeutics were devised. The Social Security Act was enacted in 1935, and F. D. Roosevelt created the National Foundation for Infantile Paralysis in 1938 and expanded educational facilities and scholarship funds to respond to the shortage of trained professionals. In 1942, the US joined the Second World War (1940 to 1944) and the expansion of social security coverage, including systematization of military medicine and rehabilitation of wounded soldiers, became an urgent social issue again. Then, rehabilitation medicine was considered the third type of medicine by H. Rusk, known as the "father of rehabilitation medicine," and his colleagues. Basic methods, including therapeutic exercise, range of motion testing, and manual muscle strength testing constituting key elements of physical therapy, were established especially between the 1930s and 1940s.

The APA established the House of Delegates in 1944, and M. L. Wagner was elected the first president. The House of Delegates in 1947 decided to change the name of the APA to the American Physical Therapy Association (APTA) and a journal was to be published as a monthly publication. By the end of the 1940s, there were 31 training institutions and among them, 19 offered a bachelor's degree program and four provided a master's degree program. The number of PTs sharply increased to over 8,000 between 1940 and 1950. Moreover, it increased to over 15,000 in 1960 and there were 52 training programs as well. In 1969, physical therapist assistants graduated from the first physical therapist assistant programs.

In 1976, the first Combined Sections Meeting (CSM; a national convention) was held in Washington D.C., with an attendance of over 1,000 members from all over America (over 17,000 members in 2018). In 1982, C. Worthingham was selected for the first fellowship program. It is now a great honor for scientists to be selected as the Catherine Worthingham Fellow of the APTA. In 1979, the APTA came up with a course of action to raise the level of PT education from bachelor to master, leading to a sudden increase in master training programs across America, and bachelor and master training programs coexisted in the 1990s.

In 2003, guidelines for physical therapist education were adopted at the 15th General Meeting of the World Confederation for Physical Therapy (WCPT). These Guidelines serve as a standard for physical therapist education in member nations of the WCPT. Based on these Guidelines, the APTA also reviewed the education standards.

Table 1 Abridged Chronology of Physical Therapy in the US

1914-18	Techniques in military medicine used to treat wounded soldiers during the First World War (physical therapy)
1914	Start of education for Reconstruction Aids in Reed College (Portland, Oregon)
1921	Formation of the Women's Physical Therapeutic Association (umbrella group of the APTA)
1922	Holding of the first General Assembly (with an attendance of 63 Reconstruction Aids; New York) Name change to the American Physiotherapy Association (APA)
1928	Publication of a book on manual muscle strength testing (W. Wright, et al.); a polio epidemic in the US
1930	Approval of the standardized curriculum of PT education by the American Medical Association (AMA)
1935	Enactment of the Social Security Act
1938	National Foundation for Infantile Paralysis established by F. D. Roosevelt
1930-1940s	Establishment of basic methods, including therapeutic exercise, range of motion testing, and manual muscle strength testing
1944	Establishment of the House of Delegates and election of M. L. Wagner as the first president
1947	Name change to the American Physical Therapy Association (APTA)
1940s	Training institutions increased to 31 (bachelor's degree programs available in 19 institutions and master's degree programs in four institutions)
1969	Graduation from first PT assistant programs
1976	The first Combined Sections Meeting (CSM; a national convention) in Washington D.C.
1979	The APTA announced their policy to raise the level of PT education from bachelor to master
2003	Guidelines for physical therapist education adopted at the 15th General Meeting of the World Confederation for Physical Therapy (WCPT)

Credits for the university/college curriculum in the US are recognized by a private accrediting agency. Basically, this is not a government agency but it is to be recognized by the Federal Government (U.S. Department of Education [USDE] and Council for Higher Education Accreditation [CHEA]). In general, students who have graduated from an undergraduate course receive a bachelor's degree, those who have completed a master course receive a Master of Arts (MA) degree for the humanities course and a Master of Science (MSc) degree for the science course, and those who have completed a doctoral program receive a doctorate in their chosen specialty, such as Doctor of Philosophy (Ph.D.). At present, if you want to be a PT in the US, you should basically have a bachelor's degree and must complete a three-year course recognized by the Commission on Accreditation in Physical Therapy Education (CAPTE). There are 256 courses available throughout the US. During these courses, you should satisfy the education standards (entry level) specified by the WCPT and APTA. The curriculum varies from course (university/college) to course, and education or research within the campus and clinical instruction account for about 80% and 20% (an average of 27.5 weeks) of the curriculum, respectively. If you have completed the curriculum, you will obtain a Doctor of Physical Therapy (DPT). A person with any bachelor's degree is eligible to enter this course and as the entrance requirements, many universities/colleges stipulate that candidates should have completed prescribed courses (mainly science courses such as biology and statistics) beforehand in bachelor's programs. Some universities/colleges require candidates to take GRE (Graduate Record Examination) or earn the minimum GPA (Grade Point Average) score. Furthermore, candidates may also need to work as a volunteer or watch PTs actually working in a hospital or clinic. The APTA declares that new students will not be allowed to receive a Master of Physical Therapy (MPT) degree or a Master of Science in Physical Therapy (MSPT) degree and that candidates who want to work as PTs must have a CAPTE-accredited degree and pass national and state examinations. The APTA has 68,968 members registered

with the WCPT in 2019. PT has ranked high in a famous business magazine and is especially popular among women.

2) Changes in the roles of physical therapy in the US

To begin with, Japanese physical therapy (system) has been under the strong influence of the US. Therefore, you can consider that basic roles of physical therapy do not differ greatly between Japan and the US. However, if you are actually involved in physical therapy, you will notice various differences between the two countries.

First, no healthcare system (universal health insurance system) has been established as social insurance in the US. Generally speaking, most workers take out private insurance and as part of company's welfare programs, a business owner often partially bears expenses to make a group of workers buy insurance, whereas there are many uninsured people and many people cannot receive adequate security depending on the type of insurance they take out. Medicare and Medicaid enacted in 1965 are available as public medical insurance for the elderly.

Medicare is available for the elderly aged 65 and over and people with disabilities (such as disabled people under the age of 65 who have diseases, including end-stage renal disease and amyotrophic lateral sclerosis, or those who satisfy certain conditions). Nursing care is not covered by Medicare, and people covered by Medicare have to buy private nursing-care insurance; there is no public nursing-care insurance system like Japan. The rate of aging in the US was 14.1% in 2015 and 15.8% in 2020 and is expected to exceed 20% by 2040.

Medicaid is a medical assistance program that is available to low-income people, and there are considerable economic restrictions, such as income and assets, imposed on Medicaid candidates. Insurance coverage for treatment depends on the type of contracted private insurance. Treatment of serious diseases and rehabilitation are not covered by insurance, posing a big social problem. For this reason, American insurance companies offer private nursing-care insurance and disease-specific insurance (such as cancer insurance) systems. A survey in 2009 revealed that 93.4% of people aged 65 and over entered Medicare, and 59.0% of them bought private insurance at the same time. It is said that informal care (provided by family members or volunteers) accounts for 90% or more of nursing care of the elderly living in a community. This phenomenon may be unique to the US in which self-responsibility is highly valued.

However, recently, the US government is adopting programs such as Program All-inclusive Care for Elderly (PACE) that provide comprehensive support services in the community for individuals for whom in home care is difficult, to keep them living at home even after the state certifies their admission to a nursing home for requiring nursing care, and respite care where care workers or volunteers provide temporary care at night or on weekends.

Second, American physical therapists can provide medical care without a doctor's prescription. Thus, they can also start businesses. In Japan, no physical therapy is allowed to be provided without a doctor's prescription under the Physical Therapists and Occupational Therapists Act. Although permitted medical treatment varies more or less from state to state in the US, direct access to physical therapists is basically allowed without a doctor's prescription across America (50 states and the Virgin Islands of the United States). This was allowed first in some states in 1957 and later across America. At present, 20 states allow unlimited direct access to physical therapy. There are some restrictions, such as treatment time or frequency, needle electromyogram, and spinal manipulation, in 27 states, Washington D.C., and the Virgin Islands. Direct access to evaluation and fitness and wellness is allowed in the remaining three states, although a doctor's prescription is required for some diseases.

As mentioned above, the US healthcare system basically relies heavily on private insurance. Therefore, insurance companies managing insurance policies try to reduce healthcare costs from a

managerial perspective. This is the reason that physical therapists are strongly encouraged to provide therapy from a scientific point of view by creating a clinical path as a rational therapeutic strategy to shorten the duration of hospitalization, carrying out evidence-based physical therapy (EBPT), and clarifying outcomes.

3) History and definition of physical therapy in the UK

The Chartered Society of Physiotherapy (CSP) defines physical therapy as helping restore the movement and function when someone is affected by injury, illness, or disability. Since the UK is made up of four constituent parts, it does not have many standard documents on the history of physical therapy, and the CSP collects and organizes oral information in commemoration of the 70th anniversary of the CSP.

According to CSP's records, the Society of Trained Masseuses created by four nurses in 1894 is the parent organization of the CSP. The purpose of the Society of Trained Masseuses was to establish massage mainly used for relaxation as a medical technique, have the public recognize that massage can be used as a medical intervention, and disseminate such ideas. In 1900, the legal and social status of the Society of Trained Masseuses improved and became the Incorporated Society of Trained Masseuses, achieving their original goals to some extent. In 1915, the first volume of the Society's journal "J. of the Incorporated Society of Trained Masseuses" was published. This journal became the CSP journal "Physiotherapy" later.

Queen Mary became Patroness in 1916 and King George V Patron in 1920, and the Society's name was changed to the Chartered Society of Massage and Medical Gymnastics. As with the US, only women were allowed to join the Society and men were permitted to take part in it from that year onward.

Chartered Society means a society approved by the Royal Household and it corresponds to a corporation in Japan.

In 1944, the Society adopted its present name, "The Chartered Society of Physiotherapy" in order to represent the scope of its work, and also changed its journal name to "J. of the Chartered Society of Physiotherapy." The title change took place in 1948 when it became Physiotherapy. In 1948, the UK carried out major health care reforms to establish the National Health Service (NHS) and the British were basically allowed to consult with physical therapists (called Physios in the UK) free of charge.

In 1949, the scope of a Physio's activities expanded to include Domiciliary Physio, leading to an increased demand for Physios (there were only 3,500 Physios at that time).

In 1951, the CSP started activities to establish the WCPT in cooperation with the APTA and the first (organization meeting) General Assembly was successfully held in London in 1953. In 1953, Queen Elizabeth II became Patroness. In 1954, the number of Physios increased to 4,310.

In the 1950s, the polio pandemic also broke out in the UK and the application of physical therapy to other fields, such as respiratory therapy, and cooperation with other professions enhanced the name recognition of Physios, making the public understand the meaning of their existence and need for their services.

In 1960, Professions Supplementary to Medicine Act established the Council for the Professions Supplementary to Medicine (CPSM) to implement a system for Physios and other allied health professions. In 1972, a Physio was elected Chair of Council for the first time. At that time, Physios were mainly trained in vocational schools called Polytechnics and in 1976, Ulster College, Belfast started the first undergraduate course in physical therapy in the UK.

Table 2 Abridged Chronology of Physical Therapy in the UK

1953	Establishment of the World Confederation for Physical Therapy (WCPT) (First General Assembly)
1960	The Professions Supplementary to Medicine Act established the Council for the Professions Supplementary to Medicine (CPSM)
1972	A Physio was elected Chair of Council for the first time
1976	Ulster College, Belfast started an undergraduate course in physical therapy
1977	The Department of Health established professional autonomy for Physios
1978	Physios were legally allowed to treat patients under the NHS without prescription of a medical doctor
1981	North East London Polytechnic established an undergraduate course in physical therapy
1982	Queen's College in Glasgow established an undergraduate course in physical therapy
1987	Abolition of an accreditation system for those who completed vocational schools
1992	Physical therapy became an all graduate entry profession (three-year course in most universities/colleges in the UK)
2001	Established legal protection of the titles "Physiotherapy" or "Physical Therapy"
2003	The CSP endorsed a professional doctorate for the first time (U. of Brighton)
2004	Supplementary prescribing rights were extended to Physios by the Department of Health
2012	The first step towards Independent Prescribing status was achieved
2013	Physios were given the right to undertake full independent prescribing after suitable training (England)
2018	Direct access to Physios was permitted for the management of musculoskeletal disorders
2019	Thirty of 51 British universities/colleges offering an undergraduate course provided a master's degree program
2019	The CSP has 47,643 members (those registered with the WCPT) and about two-thirds of Physios work at an NHS hospital

In 1977, the Department of Health established professional autonomy for Physios. The practice of physical therapy under the prescription of a medical doctor had been incorporated into the NHS, and Physios were legally allowed to treat patients under the NHS without prescription of a medical doctor in 1978. In 1979, a Physio gained a Ph.D. for the first time.

North East London Polytechnic and Queen's College in Glasgow established an undergraduate course in physical therapy in 1981 and 1982, respectively. In 1987, an accreditation system for those who had completed various training courses (such as Polytechnic) was abolished and in 1992, physical therapy became an all graduate entry profession (three-year course in most universities/colleges in the UK).

In 2001, the legal protection of the titles "Physiotherapy" or "Physical Therapy" was established by legal amendment. In 2003, the CSP endorsed a professional doctorate for the first time (U. of Brighton). In 2004, national healthcare services began under an agreement made with the NHS unions, and supplementary prescribing rights were extended to Physios by the Department of Health.

In 2012, the first step towards Independent Prescribing status was achieved and in England in 2013, Physios were given the right to undertake full independent prescribing after suitable training. In 2018, direct access to Physios was permitted for the management of musculoskeletal disorders. According to CSP's records in 2019, 30 of 51 British universities/colleges offering an undergraduate course (43 in England, three in Wales, four in Scotland, and one in Northern Ireland) provide a master's degree program. Most universities offer an M.Sc and a few universities provide an M.Phys. It seems that the U. of Brighton does not recruit students for their professional doctorate programs. The CSP has 47,643 members registered with the WCPT (World Physiotherapy from 2020) in 2019. About two-thirds of Physios work at an NHS hospital.

4) Changes in the roles of physical therapy in the UK

As mentioned above, the National Health Service (NHS) institutionalized in 1948 provides comprehensive healthcare, including preventive care and rehabilitation, free of charge as a general rule in the UK. The NHS financial resources are made up of taxes (80%), national insurance contributions (18%), and patients' charges (1% or more). Test and surgical costs are free but patients bear partial drugs costs.

The purpose of this system is to differentiate function between clinics and hospitals: Patients need to see their general practitioner (GP) first, except in an emergency, and if they need advanced medical care, they can visit another hospital by GP referral.

The NHS had attracted attention as an excellent healthcare system; however, it had problems, including a long waiting time for treatment, in the 1990s due to a lack of resources caused by medical cost containment policies as well as advanced medicine. The NHS has strived to make an organizational reform for problem-solving, reform the medical fee-for-service system, streamline medical care, and improve services, although it still has many problems, such as a Physio's work environment and maintenance of the quality of services.

In general, GPs often refer patients to Physios, and recently patients are allowed to see a Physio directly without GP referral in more areas in the UK. If you want to find a Physio, you will be able to find a private Physio near you using CSP's Physio2u directory. Before selecting a Physio, you should first ensure that the Physio is accredited by and registered with the Health and Care Professions Council (HCPC). All Physios who can provide medical care under the NHS must be registered with the HCPC. There is a consultation network of not only local Physios but also all private British Physios.

Physical therapy provided during hospitalization is basically the same as that carried out by Japanese hospitals, and outpatients and home-visit rehabilitation are coordinated by GPs. GPs are also responsible for health supervision or guidance not provided by Physios, for example, dietitian referral for nutrition education. Physical therapy may be provided under personal health insurance and it varies depending on the contract.

(Toshihiro Morinaga)

5) History and definition of physical therapy in Australia

(1) History of physical therapy

As with other nations with advanced physical therapy, the value of physical therapy as a profession in Australia was enhanced during the First World War. Many doctors and ordinary people took a skeptical view of massage treatment but could not find any other good treatment during the early days of the war. Since there was a growing need for physical rehabilitation after the war, the Australian Massage Association (AMA) worked on a hot air bath, electrotherapy, and other treatment modalities. Active exercise in a kinetotherapeutic bath was carried out instead of passive approaches around the end of the war. Physical therapy and AMA became widely known by the end of 1918. Many practitioners and citizens gradually became aware of the effects of massage, corrective exercise, and electrotherapy, leading to the establishment of an educational system for physical therapists. After the Second World War, there was a growing demand for physical therapists who could also manage patients with chronic disease as next-generation of health professionals, and their efforts to respond to the expectations have played a role in today's development of physical therapy. Physical therapy in Australia owes its development to many prominent figures.

Frederick T Hall, whose father is British and mother is Indian, made a great contribution to the development of the Australian AMA and Physical Therapy Association from the end of the 19th century and before the First World War. He had a broad knowledge of specialties such as chemistry,

pharmacy, and anatomy, and worked at healthcare service facilities in Melbourne. His knowledge of massage and techniques brought him fame later, and even the Lord Mayor of London became his customer. Many massage practitioners in those days treated patients without charge in charity hospitals and performed massage in sports clubs. He started to teach medical students the importance of physical therapy in 1900, and a person who doubled as a practitioner and Dean of Dentistry at the University of Melbourne recommended Hall as his/her successor. Hall became the most respected massage practitioner in Melbourne, implemented electrophysical agents, including electrotherapy, exercise, manipulation, and other techniques, and devoted himself to the establishment and development of the AMA. In 1905, he planned to set up "Physical Therapy Association" and began a project to establish an Australian joint association involving Melbourne, Sydney, and Adelaide the next year. The joint association was recognized by the Commonwealth; Hall took office as a secretary-general and promptly held a monthly seminar in the above three cities. Then, he immediately created an Australian curriculum, including anatomy, physiology, and pathology, updated it step-by-step, and obliged new members to take part in the educational programs; therefore, the association grew into a professional organization that was far superior in level to its counterpart in the UK.

In 1939, the AMA changed its name to Physiotherapy, which became the Australian Physiotherapy Association (APA). In response to an increased need for treatment of wounded soldiers after the First World War and the polio epidemic, the standards of physical therapy were established by the Second World War. With a growing demand for massage practitioners, many massage practitioners worked at military hospitals during the Second World War and a new health profession was widely expected to emerge due to the polio epidemic and its treatment; we, physical therapists, responded to the expectations.

In the early 1960s, a prominent figure emerged in the realm of manual therapy: Geoffrey D Maitland. He played an active part worldwide as a pioneer in the establishment of manual assessment and a therapeutic system for patients with musculoskeletal disorders. He used his excellent skills to integrate scientific knowledge, such as anatomy and pathology, into the clinical decision-making process and continued to perform international activities while teaching school in Australia. Meanwhile, he worked hard to found Australian Manual Physical Therapy Association in 1966 and International Federation of Orthopaedic Manipulative Therapy (current IFOMPT), a branch of the WCPT, in 1974. His great achievements include helping Australia develop more theoretical and scientific manual physical therapy, coupled with the prosperity of clinical reasoning, and establish a world-leading position in this area, greatly affecting many physical therapists.

After producing Maitland, Australia has turned out a great many leaders, including Gwendolen Jull, Mark Jones, David Butler, Robert Elvey, Peter O'Sullivan, Paul Hodge, and Lorimer Moseley, and established itself as a nation with advanced physical therapy. Members of the AMA, consisting of professionals who provide sophisticated clinical therapeutic techniques and have science-based knowledge of these techniques, have built a reputation with an awareness of being a pillar of national health and with a sense of responsibility, which has led to the establishment of Australia as a nation with advanced physical therapy.

Next, let's see how physical therapy in Australia has changed from an educational point of view. In 1906, School of Medicine, the University of Melbourne and the Royal Melbourne Hospital started the first two-year massage practitioner training course. The following year, Medical Electricity and Gymnastics and the University of Sydney started a massage practitioner training course, and the year after that, a Medical Gymnastics and Electricity-affiliated massage practitioner training course was offered in South Australia. After that, a three-year massage course was started in Melbourne in 1933 and its curriculum focused on muscle re-education and clinical teaching to respond to the polio epidemic at that time. In 1938, the University of Queensland solely offered a physical therapist training course called "Diploma of Physico-therapy" for the first time, and started four-year

undergraduate education in 1950. Although other universities shifted their education to institutes of technology in the 1960s, the University of Queensland consistently provided education in a university with the medical department and soon started a graduate course; Ms. Margaret Bullock was the first Australian physical therapist to obtain a Ph.D. in 1969.

What is noteworthy about the independent practice of physical therapists is that Australian physical therapists were the first in the world to be allowed to be first contact professionals under the changed ethical principles in 1976. During the last three decades of the 20th century, the fields of study for Ph.D. education expanded at several universities, and Australia successfully developed into a world leader in physical therapy research.

In summary, as indicated by education in the medical department from the early days of physical therapist training and strict clinical teaching in royal and state hospitals, continuation of sophisticated clinical techniques with a high level of scholarship helped Australia to secure a worldwide leadership position in physical therapy. Table 3 shows the abridged chronology of physical therapy in Australia.

Table 3 Abridged Chronology of Physical Therapy in Australia

1906	Formation of the Australian Massage Association (AMA) The University of Melbourne and the Royal Melbourne Hospital-affiliated massage Diploma course
1907	A Medical Electricity and Gymnastics and the University of Sydney-affiliated massage Diploma course
1908	A Medical Gymnastics and Electricity-affiliated massage practitioner training course
1918	The effects of massage and subsequent physical therapy were demonstrated through the First World War
1933	A three-year massage course started
1938	A Physico-therapy Diploma course started (the University of Queensland)
1939	The AMA was reorganized and changed to the Australian Physiotherapy Association (APA)
1940	Physical therapy Diploma education was started in Melbourne
1945	Physical therapy Diploma education was started by the University of Adelaide
1950	The University of Queensland started four-year undergraduate education. Then, it was provided in each state.
1962	Queen Elizabeth II became Patroness (an official sponsor) of the APA
1969	An Australian physical therapist gained a Ph.D. for the first time
1972	A physical therapist was elected the APA's president for the first time
1976	Ethical principles were changed to make Australian physical therapists the first in the world to be first contact professionals
1988	The Physiotherapy Research Foundation was launched
2006	Eighteen physical therapy entry-level programs in Australian universities
2010	Children with disabilities gained access to Medicare funded physical therapy
2018	The APA has over 26,000 members, 800 courses through career pathway framework

(2) Definition of physical therapy

According to the Australian Standards for Physiotherapy, physical therapy is defined as follows: "Physical therapy includes prevention and diagnosis of movement disorder, and comprehensive approaches for therapeutic management or function optimization in order to improve community health and welfare from an individual or group perspective." Physical therapists are also defined as "experts in the structure of the human body who cooperate with people of all ages in treating a wide variety of health conditions, including sports injuries, musculoskeletal diseases, and chronic poor health conditions, such as diabetes, obesity, osteoarthritis, and stroke. Physical therapists are involved in the evaluation, diagnosis, planning, and management of patient care."

From the above, you can understand that Australian physical therapists, unlike those in Japan, are recognized as total healthcare specialists responsible for prevention, evaluation, diagnosis, treatment plans, and health supervision.

6) Changes in the roles of physical therapy in Australia

As mentioned above, massage practitioners historically found their way into medicine and were also engaged in care of athletes ahead of physical therapists, and musculoskeletal and sports physical therapy first became prosperous. Then, in addition to hydrotherapy, electrotherapy, and massage, therapeutic exercise and manual therapy became mainstream physical therapy. Due to the polio epidemic around 1940, development and sophistication of medical skills and technologies for spinal cord and brain injuries caused by traffic accidents after the 1970s, and resulting lifetime extension, a specialty in nervous system diseases, chronic diseases such as cardiovascular and respiratory diseases, and internal disabilities was developed.

Some of the earliest discussions on specialization arose out of a report on career structure undertaken by a sub-committee of the Queensland branch of the APA in 1975. In 1979, a meeting was held between representatives of the Australian College of Physiotherapists and the Federal Education Committee of the APA. Based on surveys of the APA members, a proposal to organize the areas of specialization and the process of clinical specialization in Australia was developed initially by a Federal Specialization Committee established in 1980. Subsequently, an Interim Committee for Specialization was established in 1982, with representation from the College, the APA House of Delegates, Schools of Physiotherapy, and APA National Special Groups, leading to the organization of the world's first specialization of physical therapy the next year. In 1990, the Interim Committee had completed its task of developing the procedures for specialization and the responsibility for the process was handed over to the College. For specialists in Australia, there was one each in cardiopulmonary physiotherapy, gerontological physiotherapy, and sports physiotherapy and six in manipulative physiotherapy in 1996.

To be qualified as a specialist physical therapist, two-year practical experience as a physical therapist in a professional area is required, and physical therapists who have taken a test and gained a certificate of clinical specialization in physiotherapy are awarded a fellowship in a university or college and given the right to participate in educational and research activities. Applicants need to receive practical training in areas such as cardiopulmonary medicine, men's and women's pelvic health, gerontology, musculoskeletal system, neurology, occupational health, pediatrics, and sports. The APA encourages physical therapists to obtain a qualification as a specialist physical therapist because it is advantageous to them when finding a job in terms of salary and may help them take an active part both domestically and internationally.

There are also various types of practicing physical therapists in Australia: clinics with physical therapists alone still exist and there is certainly an increasing number of physical therapists who work with an orthopedist or sports medicine specialist, in the Department of Neurology or pain clinic, or with a dentist, podiatrist, speech therapist, psychotherapist, and trainer in the same clinic. From the above, the clinical work that changes dynamically with the times is favorably connected with university or college education, which is also the reason that Australia is a great power in physical therapy.

(Takashi Nakayama)

2. History of Physical Therapy in Japan (law, definition, education, roles)

1) Birth of a physical therapist in Japan

Half a century has passed since the birth of the profession of physical therapist, which came into being in Japan in 1965 when the "Physical Therapists and Occupational Therapists Act" (Law No. 137) was enacted. In 1966, the first state examination for physical and occupational therapists was conducted. On July 17, 1966 ("Physical Therapy Day"; "Physical Therapy Week"), the Japanese Physical Therapy Association (JPTA) was founded by 110 interested persons (15 university graduates) of 183 successful candidates for the state examination. At the dawn of physical therapy introduction into the country, persons providing services similar to medical treatment were permitted to take a state examination by "exceptional measures" if they had at least 5 years of work experience as healthcare workers in physical therapy and participated in a training session for 300 hours. This measure was ended in 1974. Since then, the JPTA has played an active part in contributing to the development of physical therapy in Japan from various perspectives. The JPTA is now a big organization with over 130000 members, the Japanese public has gradually recognized its own value in society and scholarship, and physical therapists have become one of the professions that play an important role in the health, healthcare, and welfare of the people. I firmly believe that this is due to the cooperation and support of physical therapists who have been involved in the progress of physical therapy (studies) in Japan and the parties concerned.

After graduating from the Health and Physical Education, Faculty of Education, Kagoshima University in 1964, the author (Nara) taught at Hongo High School for one year and six months. However, Japan lagged behind other nations in terms of physical therapy at that time and the author went to America in 1967 to specialize in physical therapy at Loma Linda University (LLU). At that time, Japanese universities/colleges required students to study general education subjects (common education programs) for one year and six months after entrance, and they were not allowed to progress to specialist training unless they had studied the necessary subjects and earned credits. The LLU permitted the author to use most of the credits in the general education subjects he earned at Kagoshima University so that he could enter a specialist training program at the LLU. After graduating from the LLU, the author was engaged in clinical practice for about one year and six months in Los Angeles. The author was in the US for a total of 5 years and has been a member of the JPTA since his return to Japan in 1971 when he was 29 years old.

The author has served on an executive board of the JPTA for a total of 30 years (16 years as a director between 1973 and 1988 and 14 years as a president between 1989 and 2003). From then on, the author has acted as an adviser for the JPTA until now. Based on his involvement in the JPTA, the author will explain the topic chosen for this section in the "Principles of Physical Therapy" to be published by the JPTA. The author hopes that this will be useful in building a better future for physical therapy.

2) Acts of physical therapists and their proposed revision

As stated above, the act of physical therapists has also been considered a "sister bill" to that of occupational therapists, and except for some provisions, they are based on almost similar theories that follow the basic principles very strictly. Before the enactment of this act, qualified persons involved in alternative medicine, such as a practitioner of acupuncture and moxibustion, a massage practitioner, and a judo healing therapist, were engaged in physical therapy. Most of the patients/clients at that time included wounded soldiers (the wounded) and patients with cerebral palsy, infantile paralysis, and rheumatoid arthritis, and physical therapy was provided by doctors at the Department of Orthopedics and Department of Internal Physical Medicine. However, considering the development of rehabilitation medicine in Europe and America, the Japanese government realized the necessity of providing formal education to train professions and made preparations for this purpose. In 1953, the

Department of Health and Nursing was established in the Faculty of Medicine, the University of Tokyo, and there was a plan to add the Department of Physical and Occupational Therapy to the Department of Health and Nursing; however, it was not realized due to poor understanding within the university. More specifically, if a national university wishes to establish a new faculty or department, it should submit a budgetary request to the Ministry of Education, Culture, Sports, Science and Technology, which will determine the appropriateness of approving the request, and in this case, the budgetary request was rejected by the University of Tokyo (so-called "the red gate of the University of Tokyo"). Then, the Japanese government established National Sanatorium Tokyo-affiliated Rehabilitation School that was under the jurisdiction of the former Ministry of Health and Welfare in 1963. If the Department of Physical Therapy had been established by national universities other than the University of Tokyo, we would not have had to take the long way around to create the Department of Physical Therapy in School of Allied Medical Sciences, Kanazawa University in 1979 and the Division of Physical Therapy and Occupational Therapy Sciences, Program of Health Sciences, School of Medicine, Hiroshima University in 1992. The author does not know whether it is destiny or fate, but we cannot change the course of history.

3) Necessity of radical revision of the Physical Therapists Act

The existing "Physical Therapists and Occupational Therapists Act" has a problem in that although half a century has passed since its enactment, no radical revision has been made, except for specified regulations (curricula) for both physical and occupational therapists. Japan's political system is based on the principle of the separation of the three powers (of judicature, legislation, and administration) for ensuring the people's lives in a democratic manner, and the political system itself is desirable. However, in reality, a sense of sectionalism lacks the flexibility to develop a social system on the basis of the traditional Japanese culture, permitting Japanese people to avoid responsibility to execute a reform and take their own side. In other words, they lack self-understanding to know for whom they are doing their duties.

When it comes only to the Physical Therapists Act, physical therapy is defined in Article 2 as "Having people with physical disabilities engage in therapeutic exercise or other exercise, and adding electrical stimulation, massages, heat, and other electrophysical modalities, mainly in order to restore abilities of the basic activities." The definition that forms the core of professional education and duties remains unchanged for half a century and no longer corresponds to the current reality of physical therapy, and it needs to be revised immediately. When a new law is enacted, it is impossible for the parties concerned to be involved in the formulation of the law and it is natural that the law is discussed and established by a committee of government officials from the relevant ministries and agencies and experts. Despite all of that, the author firmly believes that the Physical Therapists Act can be revised radically in light of the philosophy and principle statements as professionals specified in the present articles of association of the JPTA.

Speaking as the former president of the JPTA, the author (Nara) advocates using the following definition of physical therapy as per the International Classification of Functioning, Disability and Health (ICF) revised in 2001: "Physical therapy is defined as the treatment of people who have body function and structure disorders using exercise, therapeutic exercise, manual therapeutic approaches and physical interventions, such as electricity and heat, to help them recover from their disorders, reverse damage, increase activities, improve functioning, promote health, including prevention, and support social participation." According to the ICF, physical therapy is defined as interventions for impairments in all patients/clients with disorders or illness and disease or conditions such as damage, dysfunction, disorders, or structure displacement and deformation as needed to support activities and participation. The Japanese Association of Occupational Therapists has created its own definition, which is not incorporated into the legal definition.

Article 2-3 of the Physical Therapists Act stipulates that the practitioner of "physical therapy" is a person that is in the business of performing physical therapy under the instruction of physicians with a license granted by the Minister of Health, Labour and Welfare and with the name of a physical therapist." In short, only the legal protection of the title "physical therapy" has been established for reasons such as the existence of persons providing services similar to medical treatment, and no occupational licensing is granted. Treatment by practicing physical therapists in foreign countries, especially North America and Australia, can be provided with a doctor's referral or a prescription. Despite some differences in physical therapist's discretionary power among the states, the US adopts a "direct access" system where a client (the term "patient" is not used in the US) can visit a physical therapy clinic directly. This system is implemented to reduce the client's healthcare costs and increase a therapist's discretionary power due to advancement of physical therapy education. For these reforms, APTA's lobbying (private political activity of individuals or organizations with certain opinions that aims to influence government policies) has helped to increase their discretionary power. In the early days of physical therapy in the US, American physical therapy education and qualification system were supervised by the AMA, although Faculty and Department of Physical Therapy have been authorized by the APTA's policies for over 20 years and there is a considerable disparity between the US and Japanese systems.

For reforms in Japan, it is important for physical therapists to provide physical therapy by doctor's referral or under the prescription of a doctor instead of doctors who speak condescendingly when treating medically unstable patients/clients during the acute and recovery phase. Although cooperation with a director or family physician is important for living phase requiring a wide range of continuous services, the time has come to approve the discretionary power of each profession.

4) Physical therapy education

Article 2-2 of the "Specified Regulations for Physical Therapist and Occupational Therapist School or Training Facilities" (MHW Ordinance No. 3) stipulates that the years required for completing a course of study at physical therapist schools or training facilities are at least three years. The JPTA's master plan proposed in 1989 includes adoption of a four-year university/college curriculum. At present, four-year universities/colleges and four-year vocational schools account for one-thirds and one-thirds of the Japanese educational facilities, respectively, and it may be acceptable to set the term of study at four years or longer. The author is sure that the level of physical therapy (studies) in Japan will increase remarkably if the term of study is six years or longer like some advanced nations and a one-year Doctor in Physical Therapy (DPT) course is added. The term of study for a pharmacist became six years or more in 2006 and some pharmacy students who have the intention to conduct research in pharmaceutical companies, etc. go on to graduate school after obtaining a bachelor's degree.

A three-stage approach is used to provide clinical instruction (i.e., tour, evaluation, and comprehensive practice) and because it is clinical training before qualification acquisition, this issue has also been deliberated in the Diet as so-called unlicensed medical treatment. The authors propose that aside from clinical assessment practice, only successful candidates who pass a state examination after graduation should receive one-year training like resident programs at the Faculty of Medicine or Faculty of Dentistry. During this period, they are also allowed to apply for medical fees and receive a certain salary because they are qualified. With this training program, one year is added to the term of study, which extends over four or five years at a minimum. In this connection, the author (Nara) did his internship for five months after completing a two-year specialized course at the LLU from which he graduated in 1969, and his term of study was virtually four and a half years. The facility in which the author did his internship paid his necessary expenses for the internship (travel, food, and accommodation expenses and wages).

The specified regulations related to physical therapy education in Japan have not been revised for 20 years since their establishment in 1999. The number of credits set by the specified regulations from FY2020 increased from 93 to 101, and some subjects were added with an increased number of clinical training sessions. “Clinical clerkship,” where interns practice medicine under the supervision of a clinical educator, is recommended for clinical training. This might be a proper method, but it also posed a problem because some students solely practiced medicine even under the guidance and supervision of a clinical educator.

5) Integration of knowledge and skills of physical therapy and definition of education

As with other health professions, an oral test was conducted as part of a state examination for physical therapists; however, it was physically difficult to conduct the oral test due to an increased number of test takers, and it was abolished for the state examination for physical therapists in the latter half of the 1970s. Although questions about patients are included instead of the oral test, the author has the impression that teachers and students at training schools make light of the integration of knowledge and skills of physical therapy.

This is a serious issue if physical therapy education is regarded as practical knowledge from a future point of view. For your reference, physical therapy associations in nations such as the UK and Denmark are unions (amalgamated unions) and no qualifying examination is given to those who are permitted to graduate from a training school with the condition that they should enter the association. In other words, this may also mean that training schools are asked to assume responsibility for their students in exchange for great discretionary power. In that sense, these associations offer a wide variety of postgraduate training programs for those who enter the association and take the responsibility for improving treatment skills as a professional group. The philosophy of education, philosophy, and methodology for curricula and knowledge varies among these associations and they aim to train broad-minded, competent people. If Japan adopts this kind of system, it will also help to reduce the necessary expenses for conducting a state examination, and the author thinks it would be good for the Japanese government to delegate various authorities and responsibilities to training facilities.

Education (“to bring out”) also has various definitions. It is defined as “activity to work on a person with the help of others with intent to develop desirable attitudes and realize value” in Kojien, a Japanese dictionary, and the author thinks the expression “with the help of others” lacks self-education and independence and it should be corrected to “by himself/herself and with others.” Educatio in Latin is the “action of bringing up,” and originally meant breeding of animals and raising of plants, but its meaning has gradually changed to indicate bringing up of a child by a parent or training and education by a teacher. With respect to the expression “activity to (snip) realize value,” it is also hard to define a purpose and value. In 1890, the Emperor Meiji preached the roots of morality and basic principles of education as the Imperial Rescript on Education the year after the promulgation of the Meiji Constitution. With human evolution and social conditions, thoughts, and social systems of the times in mind, the author feels that we have to walk a “thorny road” to democracy based on freedom and equality.

6) Issues of methodology of education

In principle, an elementary school teacher is responsible for subjects, such as Japanese and mathematics. As the curriculum proceeds, academic subjects grow complex and it is natural that the curriculum also branches into different discipline areas. All things considered, academic disciplines are basically related to the “understanding and awareness of humans” irrespective of the subject. Teachers focus on teaching their own specialty without concerning themselves with other subjects,

whereas students are required to develop the ability to integrate specialized subjects and deepen/increase the "understanding/awareness of humans" in a comprehensive manner (Figure 1). We need to figure out a good way to promote cooperation among teachers so that students can learn in an integrated manner.

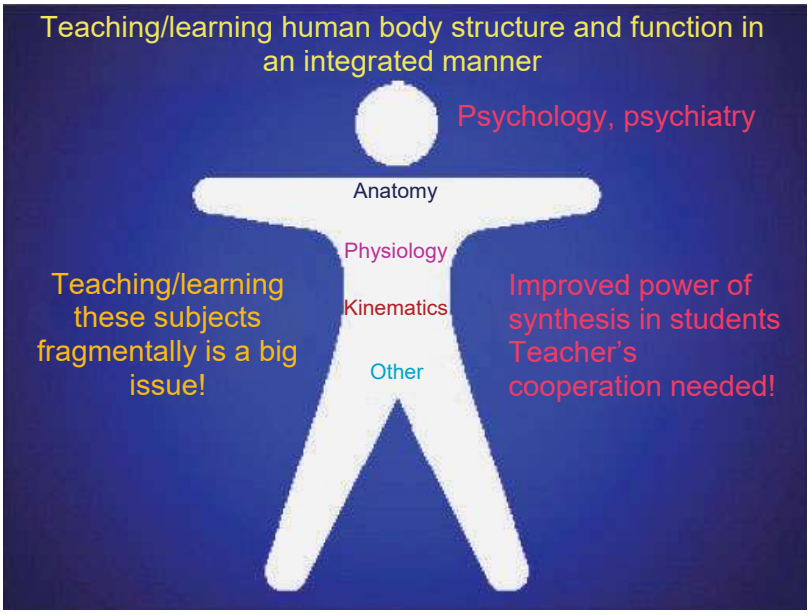

Figure 1 Teachers Finding a Solution to a Challenge in Studying Humans in a Comprehensive Manner

7) Roles of physical therapy

The author has mentioned early physical therapy a little in previous sections. At that time, physical therapy was called "aftertreatment," "internal physical medicine," or "massage, acupuncture and moxibustion therapy." As mentioned above, most of the patients/clients at that time visited the Department of Orthopedics and Department of Internal Physical Medicine, and as described in this book, the scope of physical therapy has expanded to include various diseases as people are becoming aware of its usefulness. The JPTA has 12 subcommittees and 10 divisions, which contain the "Mental and Psychological Physical Therapy Division" as with subgroups of the World Confederation for Physical Therapy (WCPT). However, unlike in Europe, a physical therapist's direct intervention in patients with psychiatric disorders is not legally acceptable in Japan, and this is an issue. This is also a legal matter for discussion, and the author thinks that human mind and body should not be separated dualistically; both science and the ICF are based on a monistic view of "body," and we also need to provide physical therapy for patients with psychiatric disorders mainly using therapeutic exercise. Ichikawa states that Mi in Japanese (corresponding to body in English) is a word of purely Japanese origin and is the same as Shin (corresponding to heart in English), implying the necessity of reframing physical therapy from a humanics point of view.

In Europe and America, veterinarians, animal health technicians, and physical therapists work together to engage in animal physical therapy for companion animals (pets), racehorses, and other animals. In Japan, physical therapists are also involved in animal physical therapy, but their numbers are small and an accreditation system is not yet available. The author (Nara) was asked to check on a young Indian elephant (it had walked for one year after birth) in Kobe City Oji Zoo in 2011 because the elephant (weighing 600 kg) had chondrosis and fissured fracture of the extremities, had been bedridden for three years, and was then four years old. For animal physical therapy, the author cut too much off of a Java sparrow's nail (his pet), causing bleeding, and stopped the bleeding by using a stick of incense to burn the blood vessel. However, the author went to the zoo and checked the young elephant the day after he received the request. The elephant apparently presented with extremity contracture and muscle

weakness; the author developed a physical therapy program and asked the veterinarian and elephant keepers in the zoo to implement it every day (Figure 2). The author also provided direct interventions about twice a month and asked the keepers to measure the joint range of motion with a goniometer he lent every week. Since it was difficult to use a muscle strength dynamometer, the muscle strength was recorded according to the manual muscle strength testing method. As one of the physical therapy programs, the author used a proprioceptive neuromuscular facilitation (PNF) approach for the healthy nose (Figure 3) and found that even if he could not communicate linguistically with the elephant, it responded to resistance as animal nature and also showed postural reflex. Considering that the joint range of motion and muscle strength of the young elephant gradually improved seven months after the first consultation, the author planned to make a firm abdominal bandage and have the elephant get down on all fours; however, unfortunately, the elephant died of intestinal volvulus as the author was about to implement the plan. Empathy is usually considered undesirable, but the author had dreamed that the elephant would walk again.

Figure 2 Bedridden Elephant with Contracture and Muscle Weakness

Figure 3 PNF for the Young Elephant's Nose

8) In conclusion

The author has described the "history of physical therapy in Japan (law, definition, education, roles)" despite limited space. In 1999, the JPTA held the 13th congress of the WCPT, with Nara acting as the chairman, and the Heisei Emperor presented an "Imperial Address" at the opening ceremony. In 2023, Japan will again host the WCPT Congress. This is interpreted as a sign that the JPTA's activities have been accepted both inside and outside Japan and it is very delightful. We wish to express our appreciation to our predecessors and pray that the current JPTA's members at an average age of 33 years will strive for their future.

Finally, body activities refer to the maintenance of life and living of life on the basis of the mechanism of micro and macro "movement." Extending the "movement area" finally leads to participation and the well-being and health of patients/clients. We consider that seen from such viewpoints, physical therapy is nothing more or less than improved level of cure and care in patients/clients.

(Isao Nara, Hiroyuki Fujisawa)

3. An American's Comparison of Physical Therapy for Japan and America

1) The beginning of physical therapy schools in Japan

The first schools for training physical therapists began in the 1960s. There were just a few schools spread around the country, and they were vocational schools lasting for just three years. The teachers were all foreigners who spoke only English and taught using prints in English for texts. Entrance into these schools was not difficult, and most of the students came from different backgrounds who did not know anything about rehabilitation before entering the schools. Hospital training for the students was not standardized.

At that time, American education was on a university level leading to a degree in physical therapy for a minimum of four years, and some programs on the Master's level were two and a half years for people who had previously graduated from a university in another field.

Teaching students in Japan, whose main language was not English, and using English books for study was not efficient. During class lectures and practice sessions the students tried to understand, but it was very difficult. And many students did not study once they left the classroom.

American students had to, and still have to, prepare for class beforehand and must actively participate during class. After class, they must review what was taught. They have a great deal of homework to do and must study quite a lot. The teachers do not review homework in class but teach on the next level. Tests are given often, and the students must prepare to answer questions based not only on the class lectures but on their homework as well. Students must also do research on their own for school credit. If a student does not comply with the rules for studying, the student can be dismissed from school.

It was very surprising to find that the Japanese students usually did not prepare for their classwork and did not study much after school. Tests were given only on the classwork given, and often students only did the minimal amount of studying. Students did not seem to worry about not being able to graduate from school because they did not usually get dismissed. It is still the same now.
Therefore, the level of education and level of professionalism is inadequate.

2) Schools increased and changed

Gradually the number of schools in Japan increased as the graduates gained their licenses as physical therapists and became teachers. These teachers taught in Japanese, and professional books began to be published in Japanese. Physical therapists working in hospitals increased, which improved the ability of the students to learn patient treatment during their clinical affiliations. Therefore, the level of education and hospital practice improved.

However, compared to the level of physical therapy students and therapists in America, the demand for knowledge and practical abilities are not as high for the Japanese students. And students still do not prepare for classes nor do they study in advance.
In Japan, junior colleges were begun (1980s), and entrance examinations were introduced. The educational level of the entering students increased, which helped improve the level of education. However, the professional schools still continue as before. When universities that include undergraduate, Master's, and Ph.D. program were started (1990s), more discrepancies in education and in the work place and salary increased.

The professional schools are monitored by the Japanese government's Department of Health, but the colleges are monitored by the government's Department of Education. This is totally different in America. In America, the original professional schools were removed when the four-year colleges were started (1950s), and when the programs were elevated to the Master's degree level (2002), all the colleges changed to that level. Now, the programs have upgraded to a Ph.D. level (2020), and the Master's programs are no longer used. These programs are regulated by the American Physical Therapy Association, not the government.

3) Licensing for physical therapists

In both Japan and America, therapists must pass a difficult written examination to obtain a license. The Japanese government conducts the examination, and this license can be used throughout Japan. But each state conducts the examination and controls the licensing in America. Therefore, American physical therapists must get a separate license for each state they work in.

The first Japanese licensing examinations included a practical test, because the people who took the examination were not only graduating students but also people who were hospital-trained. This system continued for a few years, after which written tests were given to only students graduating from government-monitored schools. In America, when the licensing of therapists changed to only students graduating from schools, the hospital-trained people who treated patients were given "green cards", which allowed them to continue working as therapists till they reached retirement. In comparison, the Japanese system for testing the hospital-trained people seemed too harsh, and it restricted these people from continuing to earn a living as before.

The test in America is much longer than in Japan and has many more questions to answer. And the students must study and prepare for the examination on their own. The time in school is to gain more knowledge and improve their abilities as therapists, not study for a test. Surprisingly, Japanese students prepare for the test in school and get guidance from the faculty staff.

4) Job hunting, etc.

(1) American students look for jobs mostly on their own.

(2) Japanese students receive job offers at school and often get help from the faculty. They get a lot more help from the faculty and school during their school life than American students get.

(3) After obtaining the license and graduating from school, Japanese therapists are required to work under the prescription of a medical doctor. American therapists can work independently without a doctor's prescription and can own their own offices. After graduating with a Ph.D., they receive the title of "Doctor of Physical Therapy".

(4) The levels and methods of education for the two countries are different, but most therapists equally upgrade their knowledge and therapeutic abilities once they begin their professional duties in the workplace.

5) What is expected of students who try to be physical therapists and young therapists in Japan

(1) I want Japanese students to study more, including preparation for class.
American students have to prepare for class beforehand, actively participate in class discussions, and carefully review what was taught after class. Otherwise (if they do not comply with the rules for studying), they can be dismissed from school. They are studying physical therapy in a harsh environment. Although Japanese and American students are from different countries, they are the same students with the aim of becoming physical therapists.

(2) As a health professional, please continue to study hard and think professionally at an early stage. Medical technology is making steady advances. To respond to such advances, the level of education is getting higher. You will start your career as a physical therapist in an era where an emphasis is put on what you can do rather than what you learned in training institutions.

(3) Although the level and method of education differs between the two countries, I want you to pursue specialization in your place of work and improve your knowledge and practical clinical skills. I hope that you will continue lifelong learning as a physical therapist and play an active part as a wonderful therapist.

Michele Eisemann Shimizu, RPT, MA, Ph.D.
Professor Emeritus, Prefectural University of Hiroshima

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Chapter 2
Background of Public Health and Physical Therapy

What you will learn in this chapter

In this chapter, you will learn about the roles of physical therapy (physical therapist) in public health.

You will study physical therapist and health promotion, preventive physical therapy, treatment/intervention, habilitation, and rehabilitation, under the World Physiotherapy definition of physical therapy, from a global perspective. Considering the future development of physical therapy in the preventive field, you are advised to think about the socialization of physical therapy as professionals in exercise and physical activity. Public health aims at preventing disease, and preventing diseases and maintaining health at a community level (including ensuring worker's health). Health promotion is an evolving field focusing on population health rather than a one-on-one therapeutic relationship. In addition, you will learn physical therapy in conventional medical rehabilitation and the roles of health professionals trying to realize a community-based cohesive society from the viewpoint of residents working to improve community infrastructure.

Necessity of Public Health Studies in Physical Therapy

Contribution to public health (studies) is one of the roles of physical therapy. Physical therapy has played a major role in healthcare and rehabilitation in Japan to date. Public health is referred to as the science of theory and practice targeting community health and population health issues. It is separated from medical practice that focuses on individual health issues.

For strategies to address health issues, public health activities share the same foundations as healthcare and medical science in terms of the fundamental understanding of syndromes and disabilities; however, public health requires different approaches to identify the risk of health issues for three factors (i.e., an epidemiology-based population, environment, and individual) and propose a solution to the population, community, administration, and other bodies, although the practice of physical therapy is based on a doctor's instructions and requests as a healthcare practitioner.

WCPT, in cooperation with the World Health Organization (WHO), has been committed to the mission of contributing to the health of individuals and populations since its birth. Likewise, academic and practical activities contributing to public health are also necessary for physical therapy in Japan. Japanese physical therapists have promoted rehabilitation with the primary objective of responding to individual cases of diseases or disabilities. They have accumulated knowledge and techniques, aiming mainly at establishing the framework for practical physical therapy with a focus on health issues (including etiology, pathology, and life tasks) for people with syndromes and disabilities. As ICF-based practice, these reflect the progress of physical therapy theory (studies) from a healthcare and medical point of view.

You are encouraged to understand these backgrounds as well as the methodologies specific to public health studies, and broaden your field of expertise to include health maintenance and promotion.

On the other hand, we cannot afford to put off the optimal distribution of healthcare resources on the basis of demographic changes in Japan from a standpoint of public health studies. It is predicted that

there will be increasing demands for practical physical therapy for people who may have diseases or disabilities on a population basis. Since the enactment of the Community Health Act, community-based and preventive physical therapy have established a legal basis, and besides individual physical therapy in conventional healthcare, they have solidified the foundation of public health, considering the social challenges that are common to the environment and group to which the target population belongs, and that cannot be overcome by the efforts of individuals in the target population.

Individual physical therapists will be asked to engage in public health activities instead of their member organizations (such as hospitals, facilities, local governments, Physical Therapy Association, and other academic societies). Then, we will be asked to learn how to deliver physical therapy services and develop a way to offer better physical therapy services.

As an example of ideal physical therapy services with health promotion for "health improvement" in mind, it is important for us to create an environment in which we can involve ourselves with others, connect with others, and support each other so that we can stay motivated and continuously address the risks prevalent in a community. In modern society, the biggest challenge to health improvement is the loss of relationship, and it is said that redevelopment of communication skills is necessary for rebuilding the relationship. Communication in the community, at work, and at home may help improve the environment for health improvement. Physical therapists with contents of physical therapy also have a role to play in actively enhancing the above-mentioned involvement in health improvement in public health. It is particularly important to support disabled people and provide a place where they can receive support for health improvement.

As described above, physical therapists need to pursue their studies to acquire knowledge of and expertise in direct and indirect physical therapy and gain knowledge and expertise to meet social demands for physical therapists in new services, such as community-based integrated care, prevention activities for health problems, industrial hygiene not covered by a fee-for-service system, school health, and the media industry, and they have to be prepared.

(Akira Kimura)

Public Health and Medicine
Distinctions Between Public Health and Medicine

HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

Public Health	**Medicine**
Primary focus on populations	Primary focus on individuals
Public service ethics as an extension of personal interest	Personal service ethics in the context of social responsibility
Emphasis on disease prevention and health promotion for entire communities	Emphasis on disease diagnosis, treatment, and care of the individual patient
A public health paradigm adopts an environment, human behavior and lifestyles, and a series of interventions designed for treatment	A healthcare paradigm gives primary importance to healthcare
Specializations organized, for example, by analytical method (epidemiology, toxicology); setting and population (occupational health, global health); substantive health problem (environmental health, nutrition) beyond a professional degree in public health	Specializations organized, for example, by organ system (cardiology, neurology); patient group (obstetrics, pediatrics); etiology and pathophysiology (infectious disease, oncology); technical skill (radiology, surgery) beyond a medical degree
Biological sciences central, with a prime focus on major threats to the health of populations; research moves between laboratory and field	Biological sciences central, stimulated by needs of patients; research moves between laboratory and bedside
Population science and quantitative analysis constituting the essential features of public health	Numerical and computational science increasing remarkably but occupying a relatively small portion
Social and public policy disciplines an integral part of public health education	Social sciences generally an elective part of medical education

Reference: Distinctions between public health and medicine (source: handouts supplied by Harvard School of Public Health in 2019; translated by the author)

1. WCPT's Development of Physical Therapy

In 1951, the UK and US took the initiative in discussing a basic plan for forming World Confederation for Physical Therapy (WCPT) and in 1953, 11 countries participated in the first international academic meeting and the second General Assembly in London. The WCPT's HQ is located in London. The WCPT is registered in England and Wales as its official organization name. The WCPT started to use World Physiotherapy as its operating name in 2020.

At present, the WCPT consists of five regions (Africa, Asia Western Pacific, Europe, North America Caribbean, and South America) and has independent subsidiary international organizations specialized in 14 different areas ([1] Acupuncture; [2] Aquatic; [3] Cardio-respiratory; [4] Electrophysical; [5] HIV/AIDS, Oncology, Hospice and Palliative care; [6] Mental Health; [7] Musculoskeletal; [8] Neurology; [9] Occupational Health and Ergonomics; [10] Older People; [11] Paediatrics; [12] Pelvic and Women's Health; [13] Private Practice; and [14] Sports).

Since the establishment of the Japanese Physical Therapy Association (1966), Japan had tried to join the WCPT on the advice of American lecturers who were involved in PT education in Japan at that time. However, Japan could not satisfy the conditions for membership due to the domestic affairs of the time. People involved in physical therapy in Japan approached the then Ministry of Health and Welfare to establish international-standard physical therapist education and class systems with the support and advice of the WCPT. After that, the domestic affairs were settled and Japanese accession to the WCPT was approved at the eighth General Assembly held in Montreal, Canada, in 1974. Japan was elected as a member country of the executive committee in the WCPT in 1982 and the 13th academic meeting was held in Yokohama in 1999. WCPT congress will be held again in Tokyo in 2023 (*postponed until 2025).

There are many developing countries in the world that have not established physical therapist education and class systems. As Japan received advice from the WCPT at the dawn of physical therapy's introduction to the country, these countries also need assistance from the WCPT acting as an NGO with a close relationship to WHO.

The articles of association specify the purpose of establishing the WCPT. In summary, as an international umbrella organization consisting of physical therapy associations from 122 countries and regions all over the world (a total of 670,000 members), the WCPT aims to deepen friendships among physical therapists from the member nations to promote academic exchange, ensuring high-quality physical therapy services for all people who need physical therapy worldwide without being merely a friendly organization, and to encourage all WCPT member nations to provide education programs specified by the WCPT to this end. To accomplish these goals, the WCPT needs to support the development of its member associations and strengthen their authority (function). Through these efforts, the WCPT tries to contribute toward maintaining the state of being physically and mentally healthy (wellness) for people around the world rather than being free from disease only, and send physical therapy information useful in maintaining and promoting health and improving physical strength to the world.

To attain these goals, the WCPT will change the schedule of academic meetings and General Assemblies that were held every four years until 2015 (every two years for academic meetings and every four years for General Assemblies) to achieve closer international cooperation.

(Toshihiro Morinaga)

1) Physical therapist and health promotion

Physical therapy's contribution to health can be considered synonymous with the accomplishment of the mission of the WCPT under the WHO's definition of health. If health is basically defined as "maintaining the state of being physically and mentally healthy (wellness) for people around the world

rather than simply being free from disease," you could say that the mission of WCPT is to disseminate information on physical therapy to the world that contributes to the maintenance and promotion of health and improving physical strength. The mission of physical therapy is to engage populations, including a wide variety of people in whom diseases or severe disorders need to be prevented, and this can be understood to correspond to the goals of public health.

Physical therapists involved in health promotion are to provide services to people with health issues, including cultivated techniques in physical therapy (such as therapeutic exercise and provision of safe electrophysical agents) and knowledge (not only direct techniques but also indirect and educational techniques including telemedicine). Their legal base is the Constitution of Japan and Health Promotion Act.

Paragraph 1, Article 25, of the Constitution of Japan stipulates that "All people shall have the right to maintain the minimum standards of wholesome and cultured living," and Paragraph 2 states that "In all spheres of life, the State shall use its endeavors for the promotion and extension of social welfare and security, and of public health." Under this Article, all people shall have the right to live a healthy life and this idea is the same as that of the WHO.

Article 2 of the Health Promotion Act stipulates that "The people must endeavor to deepen their interest in and understanding of the importance of healthy lifestyles, and to both be aware of the state of their own health and improve their health throughout the course of their lives." The efforts of the people are needed to maintain and promote health, and an emphasis is placed on the significance of "protecting our own health ourselves."

In contrast, the Health Promotion Act also emphasizes health promotion of the people in collaboration and cooperation with the State, local governments, related organizations, companies, and others, and the promotion of lifestyle disease prevention.

It is important for physical therapists dealing with health promotion to consider its legal basis and think academically (scientifically). Although physical therapists are apt to focus on the development of specific methods for performing therapy or providing exercise guidance to individuals with health issues, they should achieve goals on the basis of not only exercise and physical activity in the patients/clients and populations, but also the theoretical framework (scheme) for evaluating the health issues faced by individuals by considering the use and utilization of objective data, with panoramic information based on health theory in mind.

As a theory of the conditions for being healthy, Miyagi suggests that the three conditions constituting health, subject, etiology, and environment, should be balanced (Figure 1).

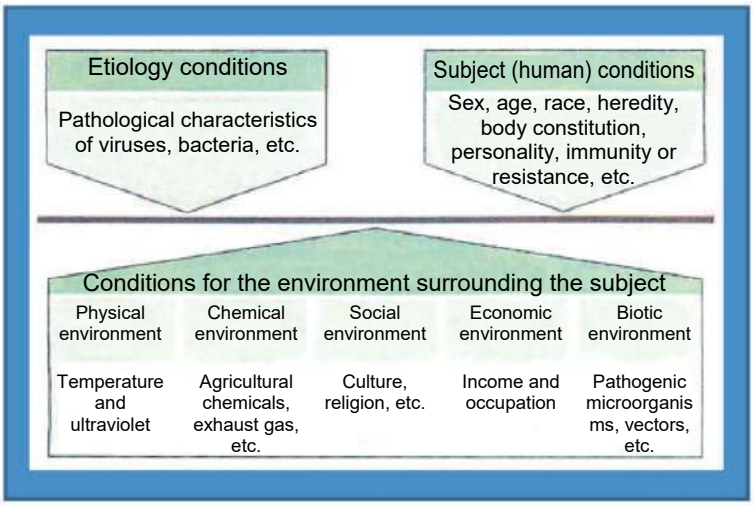

Figure 1 Conditions for Being Healthy (Mr. Shigeji Miyagi)

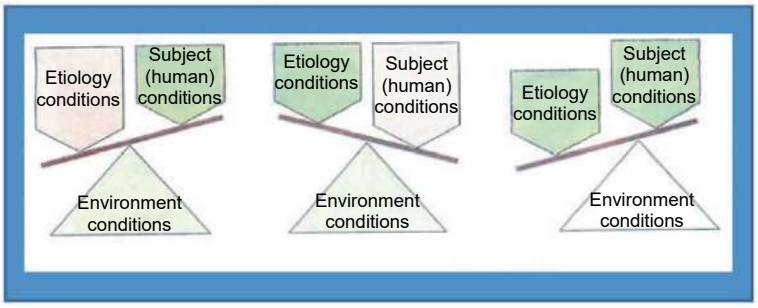

Figure 2 Imbalance of Three Conditions for Being Healthy (Mr. Shigeji Miyagi)

An imbalance of the three conditions leads to the pathology of health promotion (pathological condition) (Figure 2). It is thought that intervention by physical therapists to correct the above-mentioned imbalance in the conditions of health could ensure that each condition functions well and may improve the balance of these conditions and help physical therapists provide physical therapy services to improve physical strength and prevent disease, etc. These measures, coupled with practical, theoretical, and academic efforts for development, may contribute toward maintaining the state of being physically and mentally healthy (wellness) for all people, and will play some of the roles of physical therapy in public health.

(Akira Kimura)

2) Prevention

(1) Trends of preventive physical therapy in Japan

In the Physical Therapists and Occupational Therapists Act, physical therapy is defined as “Having people with physical disabilities engage in therapeutic exercise or other exercise, and adding electrical stimulation, massages, heat, and other electrophysical modalities, mainly in order to restore abilities of the basic activities.” As explicitly stated in this Act, physical therapy has been developed with a focus on people with physical disabilities. However, more recent evidence shows that exercise is also effective in preventing lifestyle diseases constituting risk factors for requiring nursing care and various diseases, and physical therapy is now often discussed in terms of prevention. It is vitally important, especially for Japan as it enters a super-aging society, to prevent people from developing disease or falling into a state requiring nursing care for the reduction of social security costs. Amid these changes in the current situation, the Ministry of Health, Labour and Welfare issued a notification that “Physical therapists sometimes carry out duties that are not considered assistance with medical treatment, such

as giving guidance on fall prevention, for people without physical disabilities in a business promoting preventive health care for the elderly, and it is perfectly acceptable to use the term 'physical therapist' even when they perform duties other than physical therapy as stated above" in 2013 (Figure 3). To be more specific, the Act focuses on the care of "people with physical disabilities," yet physical therapists today are also largely expected to produce results through a preventive approach to respond to a super-aging society. As described earlier, physical therapy and a physical therapist's way of working in Japan have gradually expanded their scope of application over more than half a century since the enactment of the Physical Therapists and Occupational Therapists Act in 1965.

(2) WCPT's trends in preventive physical therapy

Recently, the above-mentioned preventive involvement in people by physical therapists is rapidly growing worldwide. On the website of the WCPT, you can find the statement that "Physical therapists evaluate the physical, psychological, emotional, and social aspects of people and help maximize Quality of Life (QOL). They are working in the fields of health promotion, prevention, treatment/intervention, and rehabilitation." Thus, physical therapy as medical rehabilitation for disabled people is still an important task of a physical therapist, and physical therapists today are required to take various approaches to maximize QOL; preventive involvement is also clearly identified as one of the roles of physical therapists.

HPB-MPD Notification No. 1127-3
November 27, 2013

To: Directors of Prefectural Medical Affairs Departments (Bureaus)

Director of the Medical Professions Division,
Health Policy Bureau, Ministry of Health,
Labour and Welfare

Use of the term 'physical therapist,' etc. (notification)

The Team Medicine Promotion Council and Working Group for the Evaluation of Measures to Promote Team Medicine established within the Ministry of Health, Labour and Welfare have discussed the request for review of the scope of work by medical workers submitted by medical organizations between June and October 2013.

As one of the requests for advisory opinions regarding the appropriateness of using the term 'physical therapist' and the necessity of receiving doctor's instructions when physical therapists perform duties such as giving guidance on fall prevention, for people without physical disabilities in a business promoting preventive health care for the elderly, the medical organizations requested that "people who may have physical disabilities" should be included in the target population of physical therapy because the interpretation of the appropriateness and necessity is confusing in the field (Attachment 1).

The 20th Team Medicine Promotion Council meeting was held on October 29, 2013, in connection with this request to decide on policies described in Attachment 2 and based on these discussions, we decided to inform our decisions listed below with respect to the use of the term 'physical therapist,' etc. We would like you to carefully read the following information and ensure that you understand it, and make the information known to all parties and organizations concerned in your jurisdiction.

Description

Physical therapists sometimes carry out duties that are not considered assistance with medical treatment, such as giving guidance on fall prevention, for people without physical disabilities in a business promoting preventive health care for the elderly, and it is perfectly acceptable to use the term 'physical therapist' even when they perform duties other than physical therapy as stated above.
Physical therapists carrying out duties that are not considered assistance with medical treatment need no instructions from a doctor.

Figure 3 Notification from Director of the Medical Professions Division, Health Policy Bureau, Ministry of Health, Labour and Welfare (HPB-MPD Notification No. 1127-3)

When a literature search was carried out with prevention and physiotherapy or physical therapy as the keywords, some articles were found, including articles on prevention of deformities caused by polio published around the 1920s. However, the recent concept of prevention in physical therapy has become remarkably diverse, focusing not only on preventing the progression of disease-related disabilities (or secondary prevention) but also on preventing the worsening of conditions unrelated to a specific disease and maintaining a good condition (well-being), such as fall prevention, preventive health care for the elderly, or postnatal physical therapy, as well as disease prevention by preventing lifestyle diseases constituting risk factors for various diseases (or primary prevention).

In particular, the "Physical Therapy Summit on Global Health," starting in 2007, is one of the WCPT's symbolic approaches to preventive physical therapy. The first Physical Therapy Summit on Global Health was held under the theme of "Moving Physical Therapy Forward" as one of the programs of World Physical Therapy 2007 held in Vancouver, Canada. This Summit revealed that physical therapist is one of the major occupations related to health maintenance and that physical therapists who can provide nonpharmacological interventions, such as health education and physical activity, play a major role in the prevention and management of non-communicable disease (NCD), representing a major step in placing prevention of NCD as one of the WCPT's efforts. When the second (Amsterdam) and third (Singapore) Physical Therapy Summit on Global Health meetings were held concurrently with the congress of World Physical Therapy that is organized every four years, Health Competency Standards for NCD prevention and health promotion in physical therapy were established on the basis of these discussions.

(3) Health Competency Standards

The Health Competency Standards are composed of three principles and three recommendations:

[Principles]
[1] Incorporate theoretical and practical foundations of health competencies into physical therapist education and practice.
[2] Incorporate health-focused practice into physical therapist education and practice.
[3] Incorporate into physical therapist education and practice that health competencies need to be shared across health professionals.

[Recommendations]
[1] Health and lifestyle behavior examination/assessment tools should be core physical therapist competencies.
[2] Health protection, health promotion, and NCD prevention interventions should be core physical therapist competencies.
[3] Behavior change theories and models should underpin core health promotion and NCD prevention competencies in physical therapist practice.

As just described, the Health Competency Standards emphasize the importance of understanding not only diseases and disabilities, but also core health and providing interprofessional interventions as a physical therapist's involvement in NCD prevention. The Recommendations also indicate that we should think theoretically to learn how the patient's/client's behavior and lifestyle have changed, as typically seen in the Transtheoretical Model (a behavior change stage model). If the patient/client is at least in the "contemplation" or later stages for improvement of lifestyle, physical therapists should encourage him/her to change their behavior using the "5A model:"

Ask questions about the current lifestyle status;
Advise the patient/client on the necessity of improving their lifestyle;
Assess the current lifestyle status and the stage of behavior change in which the patient/client is;
Assist the patient/client in improving their lifestyle by providing information and psychological support; and
Arrange the situation and provide support so that the patient/client can maintain a good lifestyle.

On the other hand, "5R's" intervention should be used if the patients/clients are still in the "precontemplation" stage:

Get the patient/client to understand why his/her health topic of interest is relevant to his/her lifestyle (Relevance);
Inform the patient/client of the risk of various diseases caused by lifestyle disease (Risk);
Inform the patient/client of the benefits brought about by improvement of lifestyle (Reward);
Identify barriers to the improvement of lifestyle and discuss measures (Roadblocks); and
Increase the patient's/client's interest by repeating motivational intervention (Repetition).

As described above, the establishment of the standard guidelines and recommendations for a physical therapist's involvement in health promotion rather than response to diseases or disabilities helps the WCPT promote a physical therapist's efforts to improve health on the basis of competencies.

(4) Development of the Health Improvement Card

Development of the Health Improvement Card (HIC) is one of the accomplishments of the WCPT's efforts for health promotion and prevention. The Health Improvement Card is an evaluation tool for easy visualization of the risk of NCD mainly developed by the WCPT as part of the efforts of the World Health Professions Alliance that the WCPT is also joined to.

The HIC is developed for use by physical therapists as well as various health professionals. Needless to say, a comprehensive, versatile team approach is important for NCD prevention among patients/clients, especially for the improvement of lifestyles that constitute a risk factor for NCD. Physical therapists play an important role in this comprehensive team approach and provide nonpharmacological interventions through therapeutic exercise. The WHO adopts nine important Voluntary Global Targets for health promotion in the Global Action Plan 2013-2020; physical therapists hold a key position and they are able to directly tackle these challenges. Among various professionals, physical therapists may have the chance to show leadership in addressing health promotion for people around the world, including promotion of NCD prevention.

(5) Challenges of modern society for core health promotion

While a physical therapist's involvement in fields such as disease prevention, characterized by NCD prevention and preventive health care for the elderly, is rapidly growing worldwide, recent health promotion studies have revealed that social and environmental problems greatly affect the health of people.

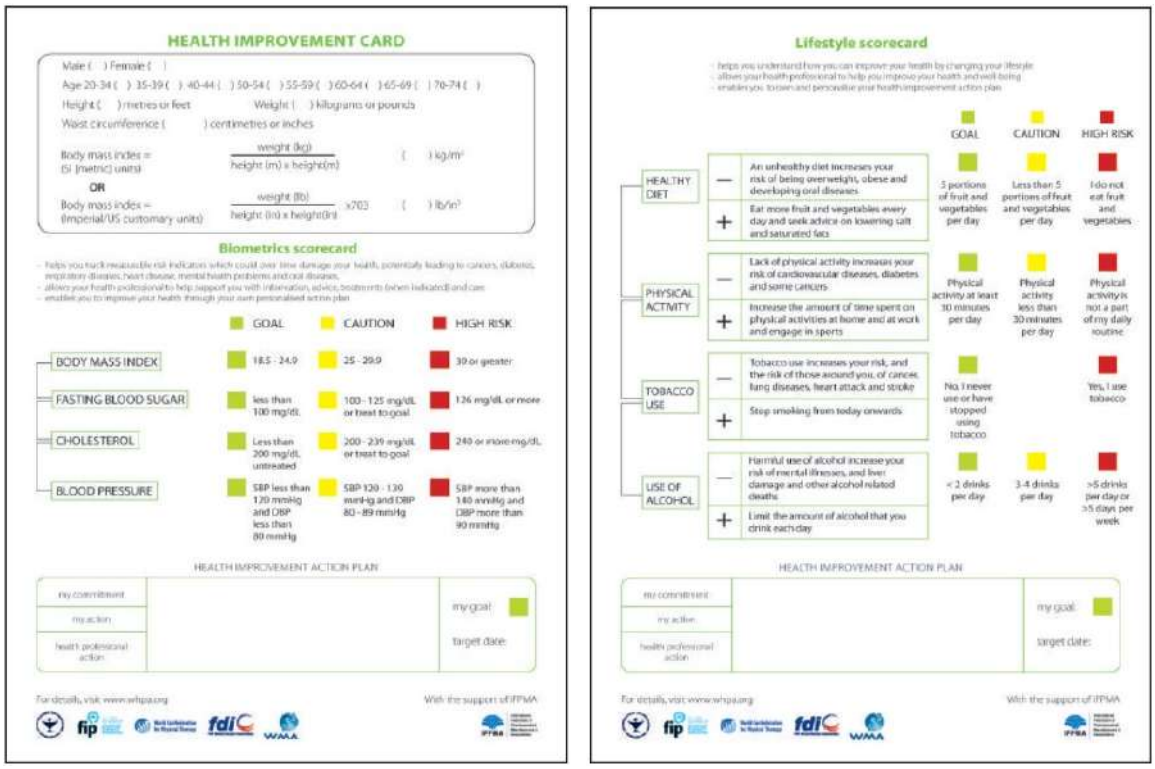

Figure 4 Health Improvement Card (the former logo of the WCPT is provided at the bottom of the page)

The WHO, established in 1948, defines health as follows:

"Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

As seen above, it is clearly stated that not only a physical aspect, such as diseases or disabilities, but also mental and social aspects are important for health. When the WHO was established, the Second World War was just over (1945) and in the aftermath of the Second World War, the world was forced to fight various infections. In countries where the effects of the war and infections diminished as time advanced, the physical aspect of health improved and the mean lifetime was also greatly extended due to improved social security policies, such as healthcare and welfare. Under these conditions, researchers gradually started to conduct a study focusing on the social aspect of health.

Figure 5 Voluntary Global Targets in the WHO Action Plan 2013-2020

(6) Health gap: Social Determinants of Health (SDH)

The term 'health gap' is often used as a keyword for recent social issues of health. Since the WHO Charter (1948) established that the possession of health is one of the fundamental rights of every human being, surveys from around the world have reported a mean lifetime extension in many countries. However, the UK Department of Health and Social Security released a report called "Inequality of Health" in 1980, revealing that the extension of the mean lifetime is affected by social factors. Then, some studies on health and social factors demonstrated that health is affected by not only physical factors such as diseases and disabilities, but also by social elements including occupational social class and economic factors, such as poverty (Social Determinants of Health [SDH]). Under such circumstances, the WHO Commission on Social Determinants of Health compiled a report, Closing the gap in a generation (2008), and declared that the WHO has a moral obligation to reduce the health gap.

The WHO and all countries of the world became aware of health gap issues, and after the WHO approved a resolution at the General Assembly to take action on the health gap (2009), the "Rio Political Declaration on Social Determinants of Health" was adopted during the World Conference on Social Determinants of Health (2011) to promote health equity.

The number of SDH-related studies is also on the increase in Japan, reporting that many socioeconomically low-class people (including low-income earners and a shorter period of education) have not had a medical health checkup, are more liable to have depression, tend to stay at home, and have experienced falls. As for the risk of frailty, studies have also reported that people who live alone, interact less with others, and have spent less time on education are liable to be frail. As with reports from around the world, Japanese people are also gradually becoming aware of the health gap.

Health Japan 21 (the official name is the National Health Promotion Movement in the 21st Century) is the backbone of Japanese health measures. Since 2013, measures, including review of the policies, have been employed as Health Japan 21 (the second term). "Extension of healthy life expectancy" and

"reduction of the health gap" have been added to the basic direction of this Health Japan 21 (the second term). Each local government practices various approaches in line with basic policies for comprehensive promotion of the health of the people of Japan (2012), and the local governments often work with local medical institutions to hold events, such as a diabetes prevention class, walking class, and health promotion campaign. According to an interim report of Health Japan 21 (the second term) published in 2018, an improvement has been seen in 32 of the 53 items (i.e., extension of healthy life expectancy, a decrease in prefectural differences in healthy life expectancy, and an increase in the number of local governments undertaking health gap measures). In each region, region-specific problems and characteristics are investigated beforehand (community diagnosis) using objective indicators and by detailed observation, and region-specific measures are tried with the help of local organizations, such as local government and medical institutions, and making use of community networks (social capitals), which is producing good results.

(7) Roles of physical therapists in correcting the health gap

What about health measures coming after Health Japan 21 (the second term) to be completed by 2022? There are emerging best practices of the health promotion cycle achieved by taking measures reflecting regional characteristics through community diagnosis. Although regional disparities are shrinking, it is a fact that health promotion does not go as smoothly as expected in some regions. As preventive measures against these situations, a "primordial prevention" perspective has drawn attention in recent years. From the standpoint of the relationship between public health and physical therapists, it can be said that the scope of a physical therapist's work is expanding to cover physical therapy in hospitals, facilities, etc. (tertiary prevention), physical therapy for high-risk groups (secondary prevention), and health-related prevention enlightenment activities (primary prevention). Primordial prevention goes beyond these approaches; however, unlike the high-risk approach and the population approach, it is not targeted at humans, but rather is an environment-oriented approach (or town planning). Primordial prevention is based on the idea that the effects of health-related SDHs are apparent and we need to build an environment and a community that will allow the community people to get healthy. Considering that the environment and community are designed, it is not hard to imagine that we need diverse perspectives, such as politics, resident autonomy, and companies. When it comes to building an easy environment in which to live or an environment that encourages you to go out or to exercise, a physical therapist's perspective may also be sufficiently useful.

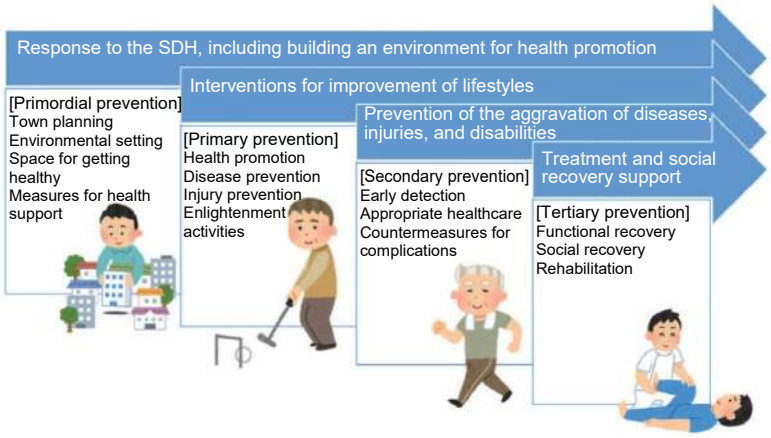

Figure 6 Prevention Stages and Desired Roles of Physical Therapists

Besides their fundamental duties of medical rehabilitation, more active roles, such as disease prevention, building an environment for health promotion, and response to the SDH, are expected for physical therapists today.

Health measures advance over 10 or 20 years and as stated in the title of the WHO's report on the health gap, we may have to work on them in a generation. Amid dynamic changes in social structures characterized by demographics, it is necessary for physical therapists to understand preventive measures of the day and keep taking up new challenges to approach society in order to be an occupational category that is always needed.

(Hiroshi Momma)

3) Treatment/intervention

(1) Target and objective

The term 'physical therapy' is derived from the combination of the Greek word 'phandsis,' which means natural, and 'therapehia' meaning treatment. Etymologically speaking, physical therapy stands for "treatment by nature" and in 1958, the WHO defined it as "the art and science of treatment through therapeutic exercise, heat, cold, light, water, massage and electricity." In Japan, Article 2 (Definition) in Chapter 1 of the "Physical Therapists and Occupational Therapists Act" (Law No. 137) stipulates that "Under this Act, 'physical therapy' is defined as having people with physical disabilities engage in therapeutic exercise or other exercise, and adding electrical stimulation, massages, heat, and other electrophysical modalities, mainly in order to restore abilities of the basic activities," and its similarity to the WHO's definition can be confirmed. Then, in 1999, World Physiotherapy released a new policy statement about physical therapy, "Description of physical therapy," and clearly indicates its objectives and target by stating in the document that "Physical therapy is services provided by physical therapists to individuals and populations to develop, maintain and restore maximum movement and functional ability throughout the lifespan," and that "The service is provided in circumstances where movement and function are threatened by ageing, injury, pain, diseases, disorders, conditions and/or environmental factors and with the understanding that functional movement is central to what it means to be healthy." At the same time, it is also stated that "Physical therapists are concerned with identifying and maximising quality of life and movement potential within the spheres of promotion, prevention, treatment/intervention and rehabilitation," which contains health promotion, prevention, treatment/intervention, and rehabilitation discussed in this chapter.

From the above, it can be said that physical therapy treatment/intervention is targeted at individuals and populations with impairment of body systems essential for movement, various motor functions, or functioning due to damage and dysfunction of body structures and functions caused by disease. In addition, physical therapy treatment/intervention is intended to maximize the residual function or compensatory (alternative) function and develop, maintain, and restore functional abilities by making full use of therapeutic exercise or electrophysical agents and with the understanding that movement and function are threatened by ageing, injury, pain, diseases, disorders, conditions and/or environmental factors, and by inducing remission and removing, overcoming, and accepting difficult circumstances in some cases.

(2) Clinical reasoning and treatment/intervention

Keeping the function of each body part above a certain level and cooperation and interaction among various functions of body systems are important for achieving functional movement and leading independent daily living. Various functions inherent in the body include musculoskeletal function, neurological function, cognitive function, postural control function, coordination function, visceral function, and metabolic function. The "treatment/intervention" of physical therapy is provided for recovery from and improvement/resolution of the above damage and dysfunction of body structures and functions caused by disease (as described earlier, physical therapy also includes health promotion and prevention for the management of damage and dysfunction of body structures and functions and rehabilitation if indicated). Therefore, understanding the damage and dysfunction of body structures and functions based on medical information and pathophysiology is essential to proper

treatment/intervention, and it is impossible to provide physical therapy treatment/intervention without analyzing characteristic signs and symptoms (analysis of signs and symptoms).

Uchiyama (2006) defines semiology of dysfunctioning as "the investigation of the cause of an impairment and adjustment of activities by incorporating observation of movement as a phenomenon caused by changes in health status and environment into a criterion," indicating a clinical thinking process model of physical therapy. To maximize the performance of body systems essential for movement and functional recovery, minimize incapacity, and achieve the maximum recovery of residual function, observation and analysis of movement should be based on functional limitation, the causes and elements of underlying impairments should be identified, and the method of resolving activity limitations or participation restrictions should be considered to practice physical therapy treatment/intervention (Figure 7).

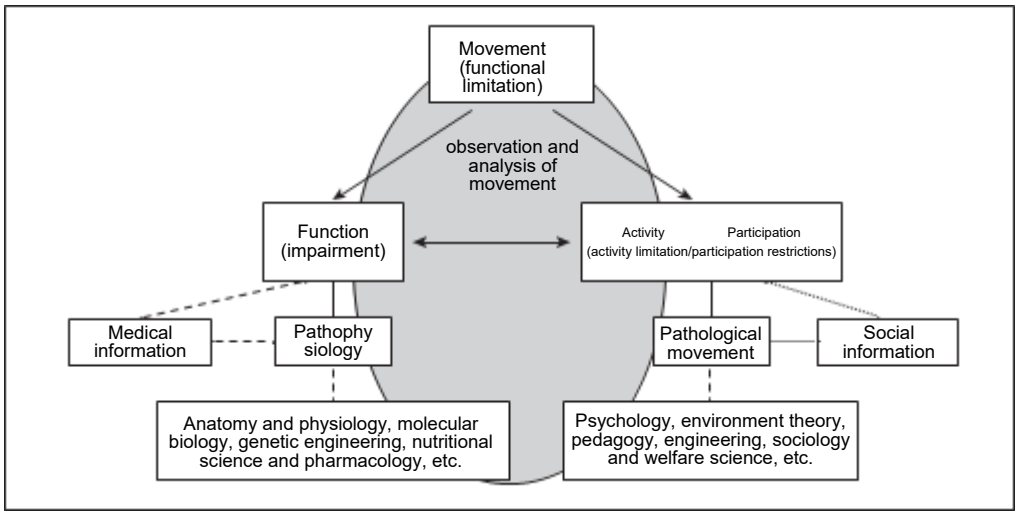

Figure 7 Bacic Framework for Semiology of Dysfunctioning

Yasushi Uchiyama: An Introduction to Semiology of Dysfunctioning. p.5, Bunkodo, 2006 (partially modified)

Notably, to investigate the reason that movement cannot be made (movement dysfunction) with the understanding of disease characteristics rather than being in a hurry to provide treatment/intervention and see results by examining what is needed for better movement (analysis of disabilities), this semiology of dysfunctioning proposes carefully collecting medical information and trying to understand disease characteristics learned from interactions, such as surgery, medication, and treatment, history of present illness, and past history, referring to anatomy and physiology, basic disciplines for physical therapy science, and nutritional science and pharmacology, both of which were also recently reflected in specified regulations, for the interpretation of pathophysiology, and identifying "the reason that the movement cannot be made" (movement dysfunction) from the aspect of molecular biology and genetic engineering; the semiology of dysfunctioning also illustrates the inference process of functional prognosis.

Verification of the treatment/intervention details (i.e., examining "what is needed for better movement" [analysis of disabilities]) is also important for physical therapy treatment/intervention. To maximize the performance of body systems essential for movement and functional recovery, minimize incapacity, and achieve maximum recovery of residual function, we must not be negligent in carefully collecting social information. For the development of positive thoughts about how to train each function of the body parts, we have to draw up and implement a treatment/intervention program based on realistic goals with social information, such as inherent ability to make a living, living environment (i.e., food, clothing, and shelter), family factors, and public service utilization, in mind. Furthermore,

each patient's/client's psychological situation is essential information for maximum recovery of residual function and it can be used as a guide to infer practical adaptability.

Finally, we are to encourage interaction between the analysis of signs and symptoms and analysis of disabilities, set goals after identifying issues, and plan and implement treatment/intervention (Figure 8).

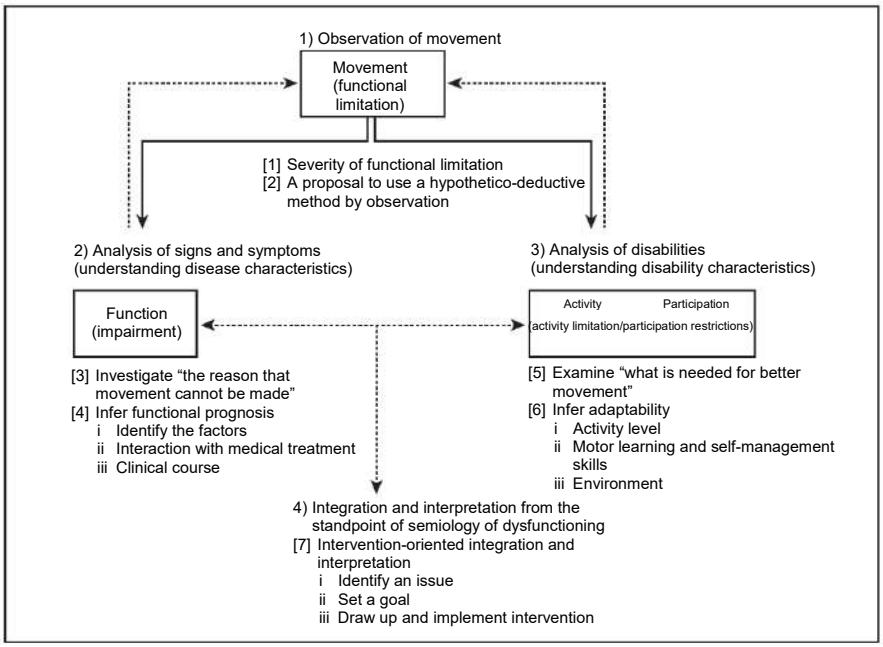

Figure 8 Clinical Thinking Process in Semiology of Dysfunctioning

Yasushi Uchiyama: An Introduction to Semiology of Dysfunctioning. p.6, Bunkodo, 2006 (partially modified)

This clinical thinking process is also called clinical reasoning or clinical decision making. Clinical reasoning is person-centered thinking or goal-oriented cognitive process; that is to say, therapists infer pathology from patient's/client's complaints and symptoms, select an appropriate testing method on the basis of a hypothesis, and decide on the most suitable intervention for the patient/client, and clinical reasoning involves this series of processes.

For the attainment of treatment/intervention goals of maximizing the performance of body systems essential for movement and achieving the maximum recovery of residual function, we must emphasize the importance of the following series of processes: Therapists make an accurate observation and evaluation and collect extensive and accurate information to get an overall picture of the patient/client, and on the basis of evidence-based achievable goals, they select and apply the optimal physical therapy treatment and intervention method/approach, evaluate the results on a regular basis, and modify it to provide an optimal method according to the reevaluation results.

(3) The actual physical therapy treatment/intervention

Physical therapists use therapeutic exercise as one of the treatment options. The term 'therapeutic' means "designed to help treat an illness" and it corresponds to physical therapy treatment/intervention. The term 'exercise' means "to train your body or parts of your body or use your ability, etc." Therapeutic exercise, a key tool in physical therapy, can then be summarized as: Training your body or parts of your body for treatment purposes.

During physical therapy, therapeutic exercise is conducted for recovery from and improvement/resolution of damage and dysfunction of body structures and functions caused by disease, and it is based on various physical functions (including musculoskeletal function, neurological

function, sensory and perceptual function, cognitive function, postural control function, coordination function, visceral function, and metabolic function) and cooperation and interaction among various functions of body systems.

[1] Muscle strengthening exercise and muscle endurance exercise

Muscle weakness is one of the characteristic signs and symptoms, such as activity limitations and movement dysfunction, that are most commonly encountered by physical therapists. The cause of muscle weakness is classified into one of the following categories: aging, myogenic, neurogenic, neuromuscular junction, disuse, and other. Muscle strengthening exercises and muscle endurance exercises must be conducted with the understanding of these causes of muscle weakness.

To carry out muscle strengthening exercises, the load based on the "overload principle," duration of muscle contraction, number of repetitions and sets, exercise frequency per week, and duration of treatment/intervention need to be determined. The load and number of repetitions are based on DeLorme's progressive resistance exercise theory. Muscle strength is dependent on the size of the cross-sectional area of muscle, although muscle strengthening effects specific to issues are observed and an increase in muscle mass is noted without an increase in muscle mass at the beginning of the muscle strengthening exercise (an increase in muscle strength per unit of muscle cross-sectional area). It is known that increased muscle strength is brought about by neurological adaptation due to an increase in the type and total number of motor units recruited (recruitment), an increase in firing rates of alpha-motor neurons (rate coding), and regulation of the timing of motor unit activation (synchronization).

Muscle endurance exercise is intended to increase type IA or II fibers, which are red muscle fibers with high oxidative capacity, and it is recommended to perform about 15 to 20 repetitions of the exercise at an intensity of ≤ 60% of the maximum muscle strength.

[2] Range of motion exercise

Limited range of motion, like muscle weakness, is also one of the characteristic signs and symptoms that are most commonly encountered by physical therapists. It is caused by a wide range of conditions, such as dermatogenic contracture, connective tissue contracture, joint contracture, muscular contracture, and neurogenic contracture.

Typical range of motion exercises include passive exercise, active-assistive exercise, active exercise, stretching, Hold and Relax, and Hold-Contact.

[3] Physical therapy for balance exercise and postural control function

Stable balance is indispensable for leading a daily life without falling, and postural control function is important. Decreased balance function is reported for all diseases, including but not limited to neurological diseases and musculoskeletal disorder, as well as for the elderly and long-term bedridden patients/clients.

A specific treatment/intervention approach is when the base of support is first widened to keep a low center of gravity, then the base of support is gradually reduced, and patients/clients are instructed to practice motor tasks so that they can control the center of gravity within the base of support and make anticipatory postural adjustments; this treatment/intervention requires the originality and ingenuity of physical therapists.

[4] Coordinated movement

Reduction in smoothness and skillfulness of movement results in decreased work efficiency, affecting independent living and quality of life. Motor coordination dysfunction includes dysmetria (hypometria or hypermetria), dysdiadochokinesia, intention tremor, decomposition of movement, and ataxia.

During physical therapy, patients/clients are instructed to move at a constant speed, practice converting the type of muscle contraction from concentric to isometric and from isometric to eccentric, and move

slowly and then quickly, perform symmetric movement and switch to ipsilateral movement, alternating movement, reciprocal movement, or diagonal reciprocal movement to ensure that they can perform exercises under feedforward control.

[5] [Functional training programs and ADL practice

While muscle strengthening exercises, range of motion exercises, balance exercises, and coordinated movement are treatment/intervention for individual functions, physical therapy is given to accomplish various practical activities of daily life, and physical therapy treatment/intervention should always consider "practical daily life."

A training program is based on three principles: the above-mentioned "overload principle," "reversibility principle," and "specificity principle." To be more specific, if patients/clients want to lead a practical daily life, they practice repeatedly on the basis of specific simulation of the form or patterns of the activities of daily living. Using the muscle strength, joint mobility, motor coordination, and balance ability needed for daily activities, patients/clients perform functional movements, such as actually standing up and walking, to accomplish various activities. Patients/clients select assistive devices such as a walking stick as needed to compensate for some impairments and attempt to get used to a new environment where assistive devices are used; this practical approach is also important for the accomplishment of various activities, and environment improvement, including selection of an assistive device, is also considered to be part of a functional training program.

[6] Physical therapy for visceral function

Physical therapy treatment/intervention is targeted at treating all patients/clients, including those with respiratory or cardiovascular disease and decreased respiratory or cardiovascular function.

Respiratory physical therapy is a physical therapy option used to prevent and treat respiratory failure in respiratory management during the chronic and acute phase, including pulmonary physical therapy for breathing exercise and induced sputum and therapeutic exercise and conditioning for independent daily living. Therapeutic exercise (aerobic exercise and resistance training) based on medical assessment and exercise prescriptions is a key element of cardiovascular physical therapy. Therapeutic exercise will help improve cardiopulmonary endurance, generally leading to improvement of exercise capacity.

Both respiratory rehabilitation and cardiac rehabilitation are long-term versatile and comprehensive programs implemented through multidisciplinary cooperation with the purpose of improving the patient's physical, psychological, social, and occupational condition, preventing or reducing the progression of underlying conditions, reducing recurrence, rehospitalization, and death, and realizing a comfortable and active life; physical therapy is one of the most important treatment/interventions for the accomplishment of various practical activities of daily life.

[7] Manual physical therapy

Manual physical therapy is a physical therapy treatment/intervention approach used to induce remission of symptoms and signs, such as neurological symptoms due to dysfunction and chronic pain, by making full use of manual therapy techniques. It has a long history and a variety of systems have been developed and become established as schools of manual physical therapy. International Federation of Orthopaedic Manipulative Physical Therapists (IFOMPT) is representative of these schools and also recognized as a subgroup of the WCPT.

(4) Summary

As treatment/intervention intended to improve the quality of life, independent living, and workability of individuals suffering from motor dysfunction due to activity limitations, therapists first infer pathology from their complaints and symptoms, identify "the reason that the movement cannot be made" (movement dysfunction), and infer functional prognosis. Then, the therapists select an appropriate testing method on the basis of a hypothesis, set goals after identifying issues, and plan and

implement treatment/intervention by examining "what is needed for better movement" (analysis of disabilities).

The therapists should always have person-centered thinking and aim to improve the individual's independent living, as well as their workability and quality of life, without indulging in treatment/intervention that is not based on clinical reasoning or unscientific procedures or tools, which is important for physical therapy treatment/intervention.

(Tetsuya Takahashi)

4) Re-habilitation/habilitation

Rehabilitation is composed of "re" and "habilitation" derived from 'habilis' in Latin. The term 'habilis' mean handy, apt, or fit; that is to say, rehabilitation means "the act of restoring to former ability" or "the act of restoring an individual to a satisfactory state." Thus, "habilitation" applies to therapeutic exercise, prosthetic-orthotic therapy, or training, education, care and education, and guidance using welfare equipment for children with innate cerebral palsy and patients/clients with congenital limb defects (though they do not always have disabilities) because they are not provided "again." However, for the sake of convenience, we include all of these cases in the category of "rehabilitation."

In this section, we will dig a little deeper and also touch on "Homo Habilis." The Homo Habilis is one of our ancestors (Homo) and lived 2.4 million to 1.4 million years ago; it is nicknamed "handy man," having a slightly large skull, and is considered an intelligent species that made stone tools. If we trace the history of the term that we described above, "rehabilitation" means "the act of empowering an individual to have human abilities." If you look up rehabilitation in the English dictionary, you will find such entries as: 1. Functional recovery training of the sick and wounded; 2. Restoration, recovery; and 3. Restoration of rights or honor. If we focus on the events that are used as the etymology of the word rehabilitation, we can present an example well-known in later eras: Joan of Arc (the Maid of Orleans) was excommunicated for heresy and tried and executed in the 15th century, although she was rehabilitated by the pope 20 years later and sainted 500 years later. This example means that a person who was deprived of human rights and dignity and alienated from society becomes socially acceptable and is rehabilitated. From the above, "rehabilitation" refers to "all processes where people with some form of disability and the socially handicapped assert their own value in a positive manner and are accepted and respected in society." As of 2019, the WHO defines rehabilitation as "a set of interventions needed for individuals who experience or are likely to experience restrictions of daily functioning owing to aging and the state of health, including chronic disease, disability, wounds, or injuries." It is also said that "rehabilitation is provided through professional rehabilitation programs or it is considered an individual-oriented health strategy integrated with other health programs and services, such as primary healthcare, mental healthcare, and an audiovisual program."

We will look at the history of rehabilitation in the 20th century, especially in the US, from a legislation point of view. The present rehabilitation policies are formed because of functional recovery, vocational training, returning to work, and education programs provided to demobilized soldiers suffering from wounds and the handicapped in Europe and the US after the First World War. Thus, "vocational rehabilitation," or rehabilitation support, was emphasized. In fact, the Soldier Rehabilitation Act of 1918 and the Vocational Rehabilitation Act of 1920 were passed in the US. Prior to medical rehabilitation, social and vocational rehabilitation first began to emerge in order to incorporate the handicapped characterized by wounded soldiers into society. Then in the US, the Vocational Rehabilitation Amendments of 1943 and 1954 that were adopted during the Second World War were expanded after the war to include services for a wide variety of handicapped people, such as those with mental disorders and mental developmental disorders and the blind, and a comprehensive program was started. The name of the Vocational Rehabilitation Amendments remained unchanged before and after the Second World War when Frank Krusen and Howard Rusk, globally distinguished

clinicians, made strenuous efforts, but after the name change to the "Rehabilitation Act" in 1973, a more comprehensive concept of rehabilitation became widespread. The enactment of this Act dealing with handicapped people's citizenship helped promote the movement of handicapped people to eliminate discrimination against people with severe disabilities, as well as "Independent Living" Movement that longed for administration for disabled people, resulting in the establishment of the "Rehabilitation Act Amendments" in 1978.

Looking at these changes in legal provisions, we notice that the concept of rehabilitation has changed with time because these Acts have evolved into multiple Acts covering education and social services, including health and employment of children with disabilities, utilization of self-help devices or welfare equipment and improved services, guaranteeing the rights of a broad range of disabled people, such as those with mental illness and post-traumatic stress disorder.

(1) Differences between medical rehabilitation and rehabilitation medicine

Medical rehabilitation is often confused with rehabilitation medicine, but Sunahara and Ueda clearly distinguish them. Showing that there is "medical rehabilitation," "vocational rehabilitation," "social rehabilitation," "educational rehabilitation," and "psychological rehabilitation" within the large framework of rehabilitation and that medical rehabilitation is one of the elements of rehabilitation, Sunahara states that medical rehabilitation will be provided in each field of clinical medicine for diseases and patients in all areas of healthcare. Medical rehabilitation corresponds to current rehabilitation healthcare.

On the other hand, Sunahara defines rehabilitation medicine (physical medicine and rehabilitation) as a new academic discipline that emerged after the war as a part of clinical medicine, and it is the art of treatment with a primary focus on motor dysfunction.

(2) Social background of the introduction of rehabilitation into healthcare

If you review the historical facts of rehabilitation introduced as healthcare activities, you will find records of rehabilitation, such as a picture of artificial legs painted on an ancient Greek pot, therapeutic exercise or mechanical orthodontic therapy for the spine, hydrotherapy in China and Egypt, or soldiers wearing an artificial hand in the Middle Ages, and understand that it has a long history. In this section, we will describe how rehabilitation was introduced into current healthcare and explain its social background.

It is a well-known fact that wars of an era have helped advance rehabilitation. In the latter part of the 19th century, a desire to be independent as a nation, industrialize a country, and implement a policy for enhancing the wealth and military strength of a country grew in Europe, and it was strongly recommended to do gymnastics or exercise to enhance the health of the people for building a strong nation. In the Netherlands, physical medicine and orthopedics, athletics, and today's manual therapy were separated from each other at the end of the 19th century and individual associations were established and evolved. On the other hand, impairment of workers and farmers wounded in war and poor public health in cities caused problems for the US early in the 19th century. The strong desire of then politicians to solve social and economic problems, which were causing public dissatisfaction, and their leadership are thought to have helped establish rehabilitation medicine.

We should not forget the pioneers of rehabilitation either. Henry Kessler, Frank Krusen, Howard Rusk, and other predecessors greatly contributed to the introduction of rehabilitation into healthcare at that time. Kessler was engaged in the New Jersey Workers Compensation Program and accomplished the task of responding to a request for rehabilitation medicine for the first time. This Program was made into a law of the United States by President Roosevelt, who also contracted polio and received electrophysical agents and underwent therapeutic exercise. We should not miss this turning point as an opportunity to make society realize the importance of rehabilitation. At that time, emphasis was put on experimentalism and empiricism, which are fundamental to existentialism philosophy, born first in the

US, as well as to science. Therefore, people of the day believed that professional training in social and physical science was important and could change the problems faced by wounded workers and soldiers, which constitutes one of the causes for rehabilitation being introduced into healthcare. Furthermore, medical education of the time, which was not founded on science- and research-based universities/colleges, was reformed and it became necessary to train high-quality doctors; the doctors were also supported by society as healthcare leaders. If we may make a shrewd observation, we could say that improvement of rehabilitation healthcare is also regarded as a national strategy to promote the social recovery of the handicapped, boost productivity, and turn them into taxpayers.

(3) Principles of rehabilitation

Principles of rehabilitation are historically expressed in various ways. For example, some advocate that rehabilitation be used to restore the right of the handicapped to live like human beings, or "total restoration of human beings," and in the words of a doctor from Mayo Clinic in the US, rehabilitation is a "trinity consisting of human rights, social recovery, and rehabilitation techniques." This is slightly old information, but a report from Advisory Council on Welfare of the Physically Handicapped People in 1957 says that "the principles of rehabilitation are based on the idea that a disabled person has the dignity of personality as a person and his/her independence contributes to the development of the entire society." As mentioned above, the principles of rehabilitation are mentioned in a variety of ways and Sunahara offers the following opinion: "If rehabilitation refers to the process of giving disabled people something to live for, it does not always mean that they have to be taxpayers, join social activities, or work at home. We have to recognize the value of their existence." We, reviewing the spectrum of rehabilitation, must remember that we have to thoroughly search for its fundamental principles.

(4) Relationship between physical therapy and rehabilitation

When Physical Medicine and Rehabilitation was founded in the US, the American Occupational Therapy Association and American Physical Therapy Association were launched in 1917 and 1920, respectively. Because Kessler was an orthopedic surgeon and Krusen was a physician who suffered from tuberculosis and fought against illness in a sanatorium, physical therapists were given an important position as key rehabilitation professionals. After the First World War, hydrotherapy and physical medicine were widely used in bathhouses from a sanitary standpoint, and physical and occupational therapists were engaged in providing healthcare. Although both physical and occupational therapists recognized their independence, they did not take on the support of the handicapped as an interdisciplinary rehabilitation team. The American Academy of Orthopaedic Surgeons and Massachusetts General Hospital were quick to provide massage therapy and hydrotherapy and perform exercise, and they were recommended as so-called programs for wounded soldiers in reconstruction hospitals. After that, this kind of medical care and rehabilitation system was adopted by military hospitals in the US, generating bureaucratic conflict among the federal agency, doctors, and vocational rehabilitation specialists. Then, colonel Mock mentioned that physical therapy, occupational therapy, and vocational training were indispensable to the best program offered by rehabilitation hospitals.

Interestingly, the American Physiotherapy Association (APA; a group of doctors), the predecessor of the current Physical Medicine and Rehabilitation, was founded as an organization of physicians with an interest in treatment using electrophysical agents, and those who studied physical medicine or athletics and who were engaged in massage therapeutic exercise were also allowed to join the APA. Most physical therapists were registered as members of the APA and electrophysical modalities, such as ultraviolet rays, electrotherapy, and whirlpool baths, composed the main portion of physical therapy at the beginning, gradually shifting to treatment approaches characterized by active exercise, and the method of muscle strength assessment and training theories based on academic research were established between 1930 and 1940. Then, the combination of rehabilitation medicine as a team

medicine, including physical therapy, occupational therapy, speech therapy, and social workers and physical medicine resulted in the establishment of the specialty "Physical Medicine and Rehabilitation," unified rehabilitation medicine, in 1947. As explained above, physical therapy has evolved in a very close relationship with rehabilitation in the US to date. We have learned that strong cooperation between politics and science (medicine), interdisciplinary professionalism, and a strong force of will for self-determination lie behind the development of nations with advanced physical therapy, such as the US and Australia (mentioned above).

(Takashi Nakayama)

2. Public Health (studies) and Physical Therapy

About half a century has passed since the birth of the profession of physical therapist in Japan. There are over 120,000 physical therapists working in Japan, and their function and scope of work have expanded. From now on, physical therapists will need to make further contributions to the health and lives of the people as established professionals supported by a long history.

It is useful to discuss measures for taking advantage of the specialty of a physical therapist for the health and lives of the people from a public health standpoint. The legal bases for the promotion of public health are Paragraph 1, Article 25 of the Constitution of Japan stipulating that "All people shall have the right to maintain the minimum standards of wholesome and cultured living" and Paragraph 2 stating that "In all spheres of life, the State shall use its endeavors for the promotion and extension of social welfare and security, and of public health." Physical therapists have also addressed important issues of public health (studies) up to now, such as industrial accidents, lifestyle diseases, and community-based integrated care systems. Physical therapists also have a history of contributing to public health measures, such as measures for polio and the war wounded and sick, which helps to establish them as professionals worldwide. We can also say that physical therapy (studies) has improved its specialty with public health (studies) as a backdrop.

It will be necessary for physical therapists to have a sense of contribution to the majority of the people and develop their function and scope of work from a public health standpoint, focusing on ensuring a healthy and cultural life and integration with social welfare and security. Their specific roles are explained as follows: 1) Providing support to remove clients' social barriers; and 2) Improving participation restrictions and disabilities and policy recommendations.

1) Providing support to remove clients' social barriers

To target the majority of the people as clients and improve their health and lives, we must clarify our view of society as physical therapists (i.e., the way that we look at our society). This is based on the principles of rehabilitation. To be more specific, physical therapists are in a position to promote diversity with the idea of social inclusion.

Diversity is the idea that society is made up of various people: Some have disabilities and others do not in this society. If we look at society in this way, disabilities will be perceived as social barriers. For example, the fact of "being unable to walk" is considered gait disturbance due to physical function at a personal level from a medical and biological point of view. However, with social barriers in mind, "being unable to walk" itself is not a disability. People who "are unable to walk" develop disabilities because society is based on the assumption that people "are able to walk." If our society is based on the assumption that people who "are unable to walk" and "able to walk" live together, disabilities seen in this light will disappear and society will evolve to ensure that various people can move freely and freely participate in society.

Physical therapists are professionals who learn deeply about the principles of rehabilitation and understand both the medical and social models. The medical models are useful in taking an approach to physical function at a personal level, while the social ones are helpful for targeting a wide variety of people as clients and eliminating social barriers.

Needless to say, it is important for physical therapists to demonstrate their specialty expertise on the basis of medical models in clinical settings and, taking advantage of their specialty, they also have an important role in the recognition of various people as clients and the provision of support for removing their social barriers. Physical therapists are expected to have a definite view of society and provide public health approaches (measures) in a flexible fashion.

2) Improving participation restrictions and disabilities and policy recommendations

In the "Physical Therapists and Occupational Therapists Act" (Law No. 137), a physical therapist is defined as a professional who "mainly in order to restore abilities of the basic activities, for people with physical disabilities engage in therapeutic exercise or other exercise." The clients (people with physical disabilities) and specialty (restore their abilities of basic activities) are obvious in this Act. We have a great pool of knowledge and techniques accumulated over half a century under this category. It is often useful to not only people with physical disabilities but also those who may develop physical disabilities and their supporters.

Physical therapist involvement has expanded to include preventive health care for the community-dwelling elderly, prevention of lifestyle diseases in the middle-aged and elderly, caregiver support, childcare support, and other services. In recent years, physical therapists are also given more opportunities to earn an obvious professional position in systems and measures, such as support for community rehabilitation activities. Examples of such evidence include approval of the use of the term physical therapist in providing guidance on fall prevention to the community-dwelling elderly in "Use of the term 'physical therapist,' etc. (notification) (HPB-MPD Notification No. 1127-3 from the Ministry of Health, Labour and Welfare, dated November 27, 2013)."

As their function and scope of work expand, physical therapists are expected to provide knowledge and techniques to help improve clients' (individuals and groups) participation restrictions and disabilities from a rehabilitation standpoint. For example, if people cannot walk a long distance so they go out in a wheelchair, differences in levels and ditches in the road will become a barrier to movement. On such occasions, physical therapists can provide therapeutic exercise to the client to help them acquire the ability to walk without the level differences and ditches being a barrier. If the client is unlikely to acquire the ability to walk from a medical point of view, physical therapists can also instruct him/her to get over the differences in levels and ditches by improving their ability to operate a wheelchair. Moreover, they can also propose improving the differences in levels and ditches using the knowledge and techniques of their residential environment. Clients' expectations for the ability of physical therapists to make various proposals mentioned above lie behind the expansion of their function and scope of work. Too many physical therapists work at a medical institution now and they must make an effort to be closer to the people. Providing physical therapists more opportunities to meet various clients, including children, adults, and elderly people, in locations such as schools, workplaces, and local governments, leads to improved utilization of their function and scope of work.

The knowledge and techniques regarding "restoration of abilities of basic activities" is the core of the specialty of physical therapy (studies) and as professionals, physical therapists are also expected to offer a high degree of professionalism and have the ability to socially recommend their knowledge and techniques. Specific systems and measures for reasonable accommodation for the handicapped are needed to realize diversity. In addition, we also need to implement systems and measures for the extension of healthy life expectancy to respond to the aging population and new occupational safety

and health systems and measures with a decreasing worker population in mind. As professionals who are able to make use of both medical and social models according to social demands, physical therapists must also make a contribution toward developing systems and measures for the improvement of participation restrictions and disabilities among various people.

Physical therapists as professionals must acquire the ability to make various proposals to individual clients and also develop the ability to widely inform the people of these proposals as various policy recommendations.

(Yasuyoshi Asakawa)

3. Population-at-risk Approach/High-risk Strategy and Physical Therapy

The basic disciplines of public health include basic/clinical medicine and social science, such as sociology, economics, and law. Furthermore, we need to perform epidemiological analysis to connect medicine with sociology and develop methods for solving public health issues on the basis of assessment of health issues in public health studies and public health practice. Medical and healthcare evidence refers to findings demonstrated by this epidemiological analysis. This approach involves observation of a group of individuals to determine the cause of disease, and the methodology is critically different from a medical treatment approach based on the etiology and pathology of disease in individuals, which falls under the same category of medicine.

It is important to see these approaches from an epidemiological and statistical standpoint. Based on the above, we need to understand the method specific to public health studies.

As a practical example of physical therapy in public health studies, physical therapists were responsible for manual muscle strength testing as part of screening programs for physically handicapped children during the polio crisis in North America in the 1940s and historically contributed toward understanding the number of patients. This is an example of how physical therapists contributed to public peace by devoting themselves to not only rehabilitation healthcare but also to public health. Physical therapists will be encouraged more to join public health activities. Thus, we need to learn the target and issues of public health and their countermeasures.

The relationship between today's physical therapy and public health comes to the surface. During the novel coronavirus infection pandemic in 2020, physical therapists became aware that they would need to incorporate public health into physical therapy because they also had an occupational risk of infection within and outside the scope of medical practice.

In the sphere of public health, there are two different measures for identifying risk factors (risk) for damaging the health of the population and reducing the risk, or a combination of these methods may be used. There may be various risks with which physical therapy effectively deals (i.e., obesity caused by physical inactivity etc., occupational low back pain due to misuse or excessive use, falls, being bedridden, infections [including infection itself and secondary transmission], secondary disorders, etc.). The frequency needs to be reduced in the population exposed to (affected by) these risks.

For this reason, methods called population-at-risk approaches or high-risk strategies are used to reduce infection risk for the population and labor risk in dangerous environments, and to promote health (Figure 9).

These methods have evolved on the basis of the science of epidemiology. Basically, epidemiology defines three factors, "person," "place," and "time," and understands the health status and health-compromising events by investigating the "number (frequency) of people with symptomatic events" to help develop measures.

Physical therapy in clinical medicine reduces risk in individuals with disabilities, while public health reduces risk in patients/clients and people with disabilities (populations), and it differs from physical therapy in terms of population risk reduction. Accepting the assumption that the distribution of the population at risk follows probabilistic rules gives us a glimpse of how the science is accommodated.

To practice physical therapy in public health, therapists need to acquire skills to perform physical therapy and provide a wide variety of health education programs, understand and put such theories into practice, and verify the results with a view to affecting policies for helping the handicapped and people at risk of health problems to make up for any deficiencies that cannot be remedied by individual efforts, or they should have the ability to report in order to make a proposal. Although these approaches have been believed to work independently until now, physical therapists are to be responsible for them as indicated in the mission statement of the WCPT.

Next, we will explain these approaches below:

1) What is a population-at-risk approach?

A population-at-risk approach is based on the idea that the overall risk is reduced by focusing on the entire population rather than targeting individuals. This approach is based on the assumption that there are some risks to the majority of people not considered high-risk, which will be discussed later, and that there are more people carrying potential risk in the background.

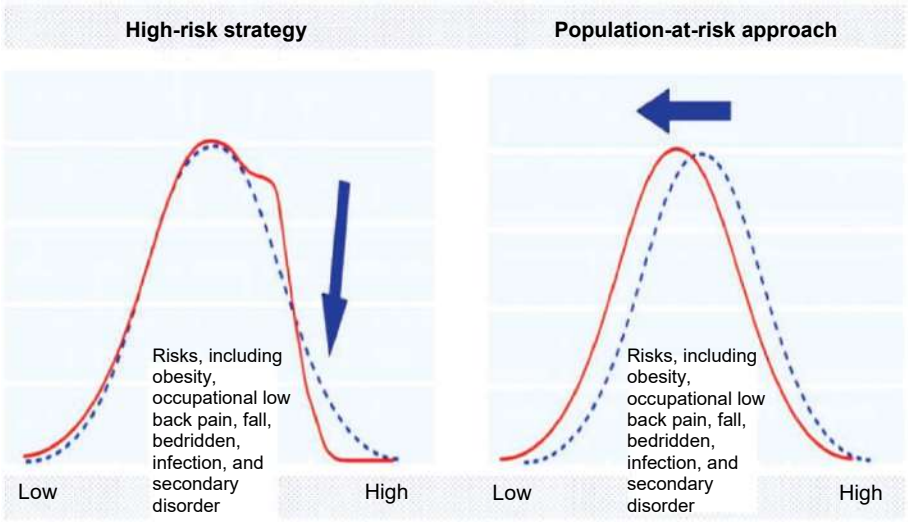

Figure 9 Population-at-risk Approach and High-risk Strategy in Public Health Studies (the figure of Ross Wilkie revised by the author; dashed lines represent a theoretical distribution and solid lines represent the state after intervention)

The population-at-risk approach is used to shift the distribution of risk in the entire population to lower levels and may be effective in reducing morbidity and mortality in the whole population. Among these statistical indicators, morbidity refers to the rate of disease in a population. Mortality, one of the same statistical indicators, refers to the number of deaths due to a specific disease. It is important to observe the morbidity and mortality indicating the number of people per population. A technique called age adjustment is needed to eliminate the effects of aging, especially for comparing annual changes. In other words, we need to make an evaluation after removing the effects of aging. We must understand epidemiological statistics to produce evidence for the intervention effect of physical therapy in public health.

Before age adjustment, we need to select an age distribution meeting a certain standard as the standard population (model population). In Japan, the age distribution of the population pyramid in 1985 is set

as the standard population (model population) and used to calculate age-adjusted morbidity and mortality.

It is thought that even if the age distribution changes with time, age adjustment may be used to calculate morbidity and mortality with the same age distribution as that for the model population.

Direct and indirect methods are available for age adjustment.

The formulas for the direct method are:

$$\text{Age-adjusted morbidity} = \frac{\Sigma\text{Age-specific morbidity} \times \text{Age-specific standard population}}{\text{Total standard population}}$$

$$= \Sigma\text{Age-specific morbidity} \times \text{Proportion of age groups to the standard population}$$

We also need to consider differences in age distribution when determining whether morbidity or mortality by municipality is higher or lower than the whole country or that in Tokyo or Osaka. However, when age-adjusted morbidity or mortality by municipality is calculated, it may be impossible to make an age-adjustment calculation using the above direct method in some cases because the population size is too small to calculate age-specific morbidity and mortality for five-year age groups. In such cases, indirect age-adjustment calculations are often made. In this approach, a group with a relatively large size, such as the whole country or Osaka, is selected as the standard group, age-specific morbidity in the group is used as a standard to calculate the "expected number of cases" in the comparator group (group by municipality), and its ratio to the actual "observed cases" is used to determine whether the result is larger or smaller compared with the standard group. As explained above, the "expected number of cases" represents the number of cases who developed disease in the age distribution in each municipality compared with the whole country (standard group) and if it is identical to the "observed number of cases," it means that the occurrence of the disease in the municipality is similar to that in the whole country.

The formulas for the indirect method are:

$$\text{Expected morbidity} = \Sigma\ \text{Age-specific morbidity in the standard group} \times \text{Age-specific population in the comparator group}$$

$$\text{Standardized incidence ratio (SIR)} = \frac{\text{Observed number of cases}}{\text{Expected number of cases}}$$

After these analyses are performed, health indicators are evaluated in the target group.

This method specifically focuses on the dissemination and enlightenment of information and is thought to provide a few effective examples. The North Karelia Project in Finland is one of the best practices for taking these essential approaches. The North Karelia Project was the world's first community intervention project to reduce deaths from ischemic heart disease in the 1970s and it was Finland's national project. Measures focusing on lifestyle intervention related to ischemic heart disease (i.e., smoking, diet, and physical activity) were taken. For example, measures involving local residents and relevant local organizations were implemented to promote health education among the residents concerned by leaders selected from among the residents, groups of homemakers, and other groups that played a responsible role in this project, as well as by local media. For dietary changes, the food industry cooperated to reduce salt content in food products and agricultural policies were shifted.

Specific examples include the development of fruit that can grow in cold climates, provision of legal support to dairy farmers that helped shift to fruit production, and agricultural promotion policies for producing vegetable oil instead of butter. In the fifth year of the North Karelia Project, National Public Health Institute, Finland, continued implementing the project and took charge of disseminating it from the model district to other areas, greatly contributing to its success. Taking these measures over 30 years resulted in changes in the dietary habits of the residents, decreased smoking rates, decreases in blood pressure and serum cholesterol, and reduction in the age-adjusted mortality from ischemic heart disease by 85% for 35 years. Improvement in the subjective health of the population and life satisfaction were also reported.

A national movement of health promotion (population-at-risk approach) is ongoing in Japan. It is intended to widely disseminate the concept of metabolic syndrome, basic ideas of lifestyle disease prevention, and other information among the people and improve the environment to support an individual's effort to improve his/her lifestyle and change his/her behavior as a whole society.

Various reports have been made on the effects of this approach. They include effective and poor results and vary depending on the combination of target, environment, and disease (health issues), although we should not be too quick to conclude that this approach is ineffective. The results will always be updated after a long verification period and by collecting many samples. We need to gather information from almost all patients/clients with this approach and note that participation rates become problematic in community health settings. This is because a low participation rate causes unclear distribution of all data. In this case, it is necessary to figure out some way to improve the participation rate and review matters including accessibility.

In Japan, physical therapists have been involved in community-based integrated care, lifestyle disease prevention, public health programs for health maintenance, and fall prevention in a business promoting preventive health care for the elderly.

Since the integration of the public health programs with preventive health care for the elderly, physical therapists have acquired an improved legal status as a result of policy recommendations and they are requested to play a more active role.

2) What is a high-risk strategy?

A high-risk strategy is a method of identifying and targeting individuals who are at high risk of disease. This strategy simply focuses on a small number of people with problems.

In epidemiology, we need to understand statistical indicators for susceptibility to a certain disease before assessment of high-risk individuals.

Prevalence and incidence rates are used to indicate the rate of disease.

They are similar but different, and we must differentiate between them; it is important to know the difference.

Prevalence refers to the proportion of individuals in a population who have a condition at a specific point in time (e.g., during a test) aside from the time that they had the condition. Given that patients in a certain population have a condition that is not curable or not fatal, the number of the patients in the population would increase. Therefore, the prevalence of the condition will rise. On the contrary, if the condition is curable or fatal, the number of patients will decrease due to cure or death. Thus, the prevalence may increase or decrease depending on the balance of patients and individuals who newly develop the disease.

Incidence rate refers to the rate of newly diagnosed cases of a disease or illness in a population over a specific period of time. Since it targets newly diagnosed patients, only individuals who may develop

the disease during a specific period of time are included in the population selected for investigating the incidence rate. Taking infectious disease as an example, it is known that once infected, an individual will develop immunity to it and not be infected again, and those who have acquired immunity are excluded from the population for the purpose of incidence rate calculation. Only the occurrence of disease is related to the incidence rate. The resulting decrease in the number of patients due to cure or lethality is not taken into account.

Physical therapy may be provided to populations with a high incidence of occupational low back pain, populations with a high chance of becoming bedridden, populations in which it is necessary to prevent contagious diseases, and populations with a chance of developing secondary disorders. A polio epidemic in North America in the latter half of the 1890s is cited as one of the practical examples of physical therapy in a population of contagious diseases.

An epidemiological approach was taken to deal with the polio epidemic because its cause was unknown at that time. To be more specific, it was thought that if people contracted a particular infection, it could be prevented by isolating (quarantining) asymptomatic children from symptomatic ones. Medical devices were less developed at that time and the onset of sudden immobility of limbs, "inability to move limbs," at an early phase of infection was detected as effective clinical findings; the method of objectively investigating the "movement of limbs" was devised.

Doctors and physical therapists trained by this method formed a caravan across North America and left the University of Vermont and because of this event, rehabilitation medicine and physical therapy gained social recognition in North America. This is one of the examples of the high-risk strategy used to practice physical therapy.

As a testing method adopting the idea of using gravity and resistance as mentioned above, MMT programs were devised by Wright and Lovert at the Department of Orthopaedic Surgery, Harvard Medical School, in 1912. Then, the programs were revised by Daniels in 1946, and most Japanese physical and occupational therapists evaluate muscle strength according to this testing method.

In other words, this activity is fieldwork itself, targeting local residents, and it shows that public health activities stem from North American physical therapy.

World Physiotherapy mentions the organizations listed below, with which physical therapists cooperate in practicing physical therapy, as high-risk strategies for disaster. In Japan, physical therapists played a role in reducing health risks in the Great East Japan earthquake and an earthquake disaster in Kyushu.

For disaster response, we should not think little of or incapacitate local responders, but we should provide support to them. They are responsible for the first response and keep offering opinions even after an emergency has occurred. After a response team has left, we should cooperate with the local responders (and improve their capabilities). We need to consider rehabilitation services at an early stage of the post-disaster response.

For the reduction of health risk in a population, the objective of the population-at-risk approach is to decrease the overall average. By contrast, the objective of the high-risk strategy is to reduce the number of individuals (incidence) who fall within the tail of the distribution curve in a high-risk population. Proper selection of statistical indicators used in epidemiological statistics according to purpose is needed for the verification of evidence.

Japanese physical therapy developed in the context of rehabilitation was actively involved in clinical medicine. Then the novel coronavirus infection pandemic occurred, and physical therapists from all over the world started to look for a way to make use of remote physical therapy as part of service delivery, and to implement measures to provide a balanced combination of public health activities and medicine in taking an approach to real and virtual "environments." When risk reduction in a

population was needed at the time that physical therapy merely emphasized manual contact as a therapeutic technique, it is important for us to focus on incorporating muscle strength testing using gravity and learning skills effective for groups, with individuality emphasized, as well as a method that utilizes a health education viewpoint. To maintain the Japanese system for medical treatment covered by health insurance, we also need to develop the ideas and evidence of physical therapy in which initiatives not included in those systems evolve together with public health studies, and this is one of the themes for physical therapists who will assume the responsibility of providing physical therapy.

(Akira Kimura)

4. Physical Therapy from the Point of View of a Universal Language Called Evidence

1) What is evidence?

Evidence is the facts, signs, or objects that make you believe that something is true. In medicine, it carries a strong sense of proven rationale (or proof). The term evidence is also used to explain to the patients in front of us that not only theoretical backgrounds are important, but the proof obtained from the verification results of similar patients is also important. The level of evidence widely used in the whole of medicine is specified by the study design (Figure 10). The study design refers to the "type of methodology used to conduct research" such as randomized controlled trials and observational studies. Evidence level is the hierarchy determined by comparison validity.

Comparison validity is a measure of comparison used to interpret effect or association. Let us suppose that Ms. A is going to receive X and Mr. B will receive Y. Given that Ms. A is a woman in her 40s with stroke and Mr. B is a man in his 80s with stroke, can you conclude that "treatment X is more effective than Y" if Ms. A made a better recovery than Mr. B?

Of course, the answer is No. This is because the extent of recovery may be affected by age or sex in some cases. As mentioned above, comparison validity refers to the degree of "comparability." Comparison validity will be 100% if the same person receives intervention under the same conditions. Since this is basically not feasible, assessment of the "degree" becomes important. The study design is one of the conditions for comparison validity.

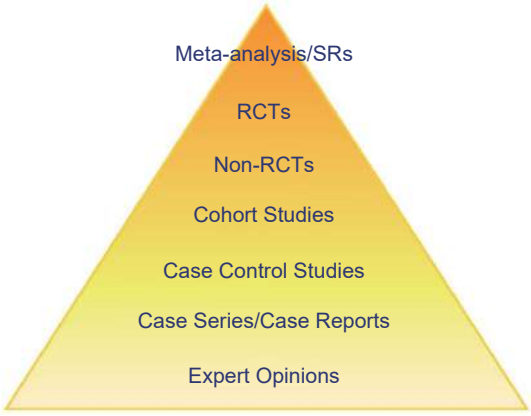

Figure 10 Evidence Pyramid

Evidence is universally accepted and distinguished from treatment that is believed blindly and provided solely on the basis of experience. Understanding the importance and utilization of evidence in physical therapy is gaining currency throughout the world.

2) What is evidence-based physical therapy (EBPT)?

As the name suggests, EBPT stands for "evidence-based physical therapy." It is originally derived from evidence-based medicine (EBM). EBM is a concept proposed by Guyatt in 1991 and defined by Haynes et al. as the "integration of a healthcare professional's clinical experience with a patient's preference and behavior and evidence." Besides the above three elements, "a patient's conditions and circumstances" are incorporated as the fourth element of EBM (Figure 11), which would be one of the most commonly used definitions of EBM in today's healthcare settings. By definition, clinical practice guidelines are useful as information containing these four elements.

When it comes to EBPT derived from EBM, it is also important for us to consider not only evidence but also other factors such as clinical experience and patient values. On the other hand, we need to note that we should not emphasize clinical experience only instead of evidence, because EBPT comes from the term "evidence-based."

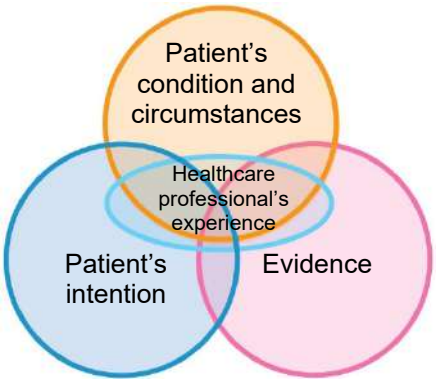

Figure 11 Evidence-based medicine

3) Information and health communication necessary to develop physical therapy utilizing evidence

Clinical knowledge is essentially needed to practice EBPT, and we also need to acquire techniques for determining what kind of physical therapy would be appropriate for patients through communication skills using health information. When you hear the phrase "communication skills," you may easily get the impression that this corresponds to the "ability to speak well." Communication in physical therapy based on public health (informative communication, health communication) means the method of handling information and specifically the way of providing patients with information for consensus development in physical therapy.

Hoffmann states that "evidence itself is oppression, and integrating shared decision making (SDM) with patient-centered communication skills leads to optimal patient care" (Figure 12). For informed consent, translated as "explanation and consent (in Japanese)," much emphasis has been placed on obtaining consent, and its intended purpose of providing education with a focus on "patient participation" has lost substance. Paternalism, informed decision, and shared decision models are originally known as consensus development models. Although all of these models are applied in different clinical settings, the paternalism model, in any event, will certainly not be selected in areas of rehabilitation or physical therapy involving high uncertainty (there are at least two treatment options). While patients are expected to choose the "treatment selected by healthcare professionals" during informed consent, neither the healthcare professionals nor the patients know the destination when undertaking consensus development in the process of SDM, and there is a possibility that neither of them will reach a conclusion. You can imagine that in the context of rehabilitation, the latter approach would be a more suitable technique of consensus development with evidence-based individuality in mind.

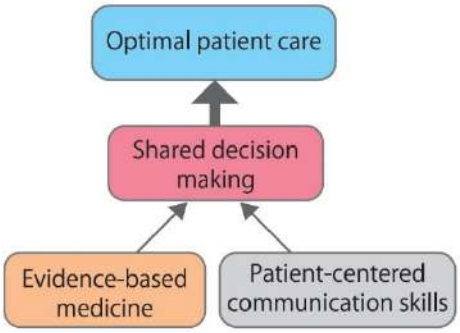

Figure 12 Schematic Drawing of Shared Decision Making

For the practice of EBPT, it is desirable to explore communication techniques useful for developing consensus by considering not only evidence but also factors such as patient's values and resources.

(Shuhei Fujimoto)

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Chapter 3
Paradigm Shift of Physical Therapy (New Challenges of Physical Therapy - Physical Therapy in the Fields of Prevention and Health Promotion)

What you will learn in this chapter

Let's think about new challenges of physical therapy - You will learn about physical therapy in the fields of prevention and health promotion.
The International Classification of Functioning, Disability and Health (ICF) takes health conditions into account. Physical therapists play a major role in the maintenance and improvement of quality of life (QOL) throughout a lifespan. In other words, we are in an era of contributing to society with good and universal services for health promotion, disease prevention, treatment and rehabilitation, non-infectious diseases, aging and performance decline through therapeutic exercise and health education based on evidence. You will study how these challenges have been undertaken in workplaces in fields such as administrative, academic, and industrial using activities by predecessors as examples.

Development in the Fields of Prevention and Health Promotion

According to intervention modes, physical therapy can be mainly classified into direct physical therapy and indirect physical therapy. Direct physical therapy is literally direct intervention in patients/clients such as manual contact and verbal instructions. Indirect physical therapy is an approach through advice, instructions, environment improvement, and education. From the viewpoint of development in the fields of prevention and health promotion, direct physical therapy is primarily intervention using the basic skills of physical therapists at healthcare and nursing care-related facilities and businesses such as hospitals. Similarly, indirect physical therapy involves giving advice to patients/clients, their families and caregivers, and providing consulting to companies, recommendations for building design, and consultation and instructions on elderly housing as healthcare service providers. It can also be anticipated that physical therapists will be involved in establishing a base of healthy living and creating a community as administrators, a planning and development department for companies, and community development committee members.

Physical therapists' skills are also useful for health promotion strategies to improve wellness through prevention. In intervention by physical therapists intended to promote health, there is direct physical therapy to assess physical strength and prescribe exercises, and give exercise instructions based on the results, and indirect physical therapy to provide guidance on health education, raising awareness of exercises, lifestyle improvement, and doing exercises. In the development of physical therapy in the fields of prevention and health promotion, not only implementation of exercises is required, but also psychological intervention to build a lifestyle suitable for prevention and health promotion such as habitually performing exercises. As for doing exercises and raising awareness about exercising, the necessity of exercising for the health of all people is obvious, so physical therapists can instruct on safe and effective exercises. In addition to safe and effective exercise guidance, in order to gain an exercise effect, it is necessary to begin exercising (development of exercise intention) in the first place

and then to continue (adherence). For starting and continuing exercises, it is necessary to understand "enjoyment" and "adherence." Csikszentmihalyi has named a comprehensive sense where one is completely absorbed in what they are doing as "flow" and described that people who experience flow do not seek accompanying rewards but the flow experience itself. In the relationship between the patient's/client's skills and the level of difficulty of a task (level of challenge), when those with poor skills challenge a difficult task, it results in an anxiety experience. In contrast, when those with high skills do an easy task, it leads to a boring experience. A flow experience emerges when the levels of skills and task match (Figure 1). For enjoying exercises, a flow experience is important, so motor tasks suitable for the patient's/client's exercise skills must be selected. It is often seen for continuing exercises that physical therapists are involved in a situation of triggering health anxiety by using the risk of disease that "you may get sick if you do not exercise." However, exercising is essentially an enjoyable activity. In other words, for expanding physical therapy in the fields of prevention and health promotion with performing and instructing exercises as keywords, physical therapy is required to have an ability to provide the patients/clients with exercise enjoyment.

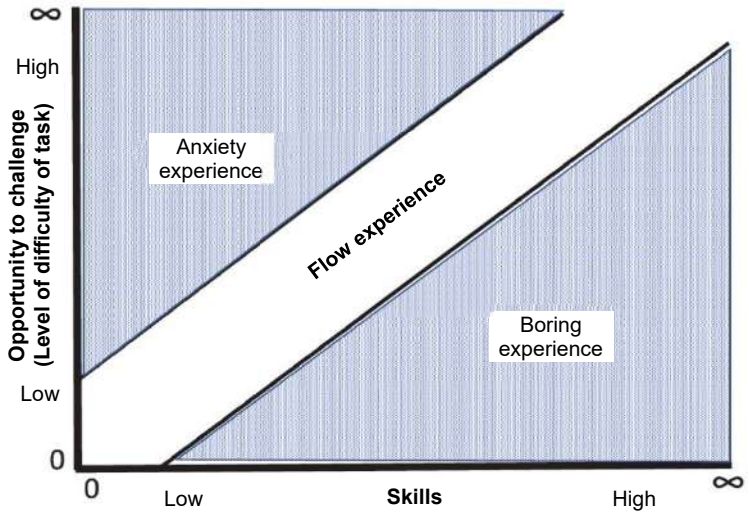

Figure 1 Flow State Model

Adherence is a word signifying "a person sticking or feeling attachment to something." Adherence related to exercise is a concept of showing strong will to continue exercising. Improving exercise adherence is an effective health promotion strategy. There are various reports on factors related to the continuation of exercising, showing relationships such as a human relations (social interaction), effects of exercise, motor skills, self-efficacy, location of an exercise place, and temporal factors. In addition, an element of "games" is also important for performing and continuing exercises. "Games" are free and enjoyable activities without conflict of interest. Roger Caillois classified games into four main items: Agon (competition), alea (chance), mimicry (mimesis), and ilinx (vertigo). These four items, the elements of games, are compared in Table 1.

Table 1 Caillois Classification of Games (Elements and Main Items)

Caillois Classification	Role for achieving the goal of the game	Example activity
Agon	Competition	Football, bowling, shogi, marbles
Alea	Chance	Roulette, lottery (Elements of gambling)
Mimicry	Mimesis	Roles, plays, playing house
Ilinx	Vertigo	Riding roller coasters (Acceleratory stimulation)

In the fields of prevention and health promotion, physical therapy can be expected to expand in various areas such as health education, government, industrial hygiene, school health, and health promotion for women. For intervention in patients/clients in all of these areas, the elements of games should be incorporated as well as paying attention to flow experience and adherence.

(Shinichi Daikuya)

1. Physical Therapy in the Area of Health Education

1) Knowledge, willingness and ability to obtain, evaluate and use health information

Health is defined as follows: “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (the Preamble to the Constitution of the World Health Organization).” All people have a right to have healthy lives. Health education is intended to maintain and promote health and is applicable to nations and people in communities. It is supported by healthcare specialists with medical knowledge and implemented on the basis of a prevention model and healthy life expectancy extension model suggested by the Ministry of Health, Labour and Welfare, academic research associations, and research organizations such as universities (e.g., prevention of lifestyle diseases, prevention of a state requiring nursing care, prevention of athletic injury, etc.).

First, the acquisition of health information starts with defining the population from which health information is to be obtained, and the target population, such as the elderly, school children, working class, women and sport athletes, is specified. Next, clinical outcomes (diseases, death, injuries, or performance decline resulting from disease) are chosen. Finally, risk factors for the clinical outcomes are grasped. The risk factors include not only personal characteristics and lifestyles (psychological and behavioral factors) but also social and environmental factors.

Effective procedures must be selected for giving health education. Examination of research data is necessary for determining more effective procedures. The following viewpoints must be available as well for understanding scientific evidence: Has the health of human population been quantitatively measured? Has the extent or degree of exposure to risk factors been understood by quantitative measurement? Has the relationship between the level of health and follow-up results been assessed? And because the time to clinical outcome varies among individuals, has the length of time been measured (monitoring)? It is important to evaluate risk factors in a prospective study, and missing important factors and drawing conclusions on the relationship with the wrong design is problematic; hence, prior knowledge on study design is also essential.

According to a document issued by the Ministry of Health, Labour and Welfare, health education is to "support individuals, families, groups or local communities to gain necessary knowledge by themselves, and be able to make necessary decisions and master faculty to proactively work on the problems with which they are confronted when these parties solve health issues that they have encountered." In order to be able to make decisions and master faculty, intentional encouragement to promote behavior changes is necessary instead of education to pass on knowledge or giving instructions (described later). In other words, physical therapists are required to gain support skills to help the residents act to maintain health as a result of their voluntary and free choice.

The amount of medical knowledge has exponentially increased in the 2000s, and the number of procedures for obtaining data has been growing through databases and applications on the Internet. Information in English-speaking countries can be instantly collected with the advancement of automatic translation functions. A drastic augmentation in the amount of knowledge and knowledge sharing is astonishing. Physical therapists should not only scrutinize resources that they have possessed in the past, but also make an effort to provide the public with maximum value by consciously and constantly noticing new information so that they can absorb it, leading to behavioral changes.

Behavioral science therapy covering intervention techniques is a common health education model. Based on the recognition of benefit and burden of modifying behavior and actual behavioral experience, decision making is enhanced to make health-oriented behavior habits. In addition, elevating self-efficacy is important (described later), and the experience of achievement, verbal explanation and feedback, and internal perception should be used to reflect them in the educational process.

Under Health Japan 21 and the Revised Health Promotion Act, physical therapists may have the responsibility to clarify health education policies and explain the results of activities to health insurance premium payers and local society. In addition, physical therapists may have the role of tackling the issue of how to respond to the "right to be continuously healthy," which common from children to adults and the elderly in a super-aging society, as well as receiving criticism from third parties and strong suggestions from society.

2) Prevention of diseases and health promotion in daily living

What we can assume from preventing diseases in daily living is preventing lifestyle diseases. Lifestyle diseases is a collective term for diseases that are closely associated with the continuation of unfavorable lifestyle habits, i.e., poor diet, a lack of exercise, smoking, drinking and stress, affecting body functions. This was previously referred to as adult diseases, but was changed to be called lifestyle diseases because they may occur in non-adults as well.

Lifestyle diseases include cancer, cerebrovascular disease and heart disease, but diabetes mellitus, hypertension, arteriosclerosis and dyslipidemia, which are considered to be risk factors for these diseases, are also part of lifestyle diseases.

Now, let's think about "habituation of behavior" for preventing these lifestyle diseases.

The first aspect is "habituation of exercise." When hearing "habituation," those who are not conscious about exercise in regular life may put too much pressure on themselves and find it difficult. "Habituation of exercise" does not mean to start a sport or go jogging, but to consciously act to move a little bit more than now in daily living. To continue patiently every day is the first step. To "walk (walking)" is frequently done when moving in daily living. To walk even a short distance has been known to consume one's energy two to three times more than when sitting at rest. For example, individuals should try to start with walking 10 minutes longer than now. In cities where public transportation is developed, the distance between stations is short so it is recommended to get off the

train or bus one station early and walk to the final destination. Office workers who often eat out at lunch are advised to go to a restaurant a little farther than that they usually go to. In addition, many simple wearable physical activity trackers and pedometers have been distributed in recent years. If specific numerical values can be checked with the use of such tools, desired values can be set, and people can more eagerly incorporate moderate exercise.

The next aspect is "smoking cessation." Immediate smoking cessation leads to disease prevention. Cigarettes contain many toxic substances and greatly adversely affect health. Decades ago, the smoking rate was 70 to 80% for adult men but had largely decreased to 29% in a recent survey (2018). Furthermore, with the total enforcement of the Health Promotion Act on April 1, 2020, indoor smoking was, in principle, banned, resulting in more thorough prevention of undesirable passive smoking. By taking this as a good opportunity, individuals should be recommended to incorporate smoking cessation behavior to lead to disease prevention and health promotion.

For "meals," the balance between an appropriate amount of energy and nutrition is important. The necessary amount of energy is determined based on age, body composition and the amount of activity. The balance between intake and consumption of energy should be kept. A method to reduce only certain nutrients or reversely increase them may be temporarily effective in some cases but it cannot be concluded that it provides a good effect in the longer term. Drinking and between-meal eating are also included in this energy and nutrition balance so attention should be paid to that.

The final aspects are "stress measures" and "rest." It can be considered that no one is free of stress, such as relationship stress at work and school, commuting stress, and family stress. Ways of coping with stress vary such as exercise and travel, but it is important to find a way to release stress that is suitable for oneself. Sleep is expected to be effective for recovery from exhaustion by physical and mental relaxation. Regular sleep keeps the physical and mental balance, and this can be considered to lead to disease prevention and health promotion.

Physical therapists are mainly involved in the habituation of exercise. Not only this, but also having overall lifestyle habits in place is crucial for disease prevention and health promotion. Hence, physical therapists should also be actively involved in it.

3) Maintenance and improvement of QOL throughout the lifespan

In order to improve QOL, in addition to being healthy, it is necessary to maintain opportunities for ties to peers and social contribution. Aging while having a purpose in life and keeping vitality is essential for society where postponing the retirement age is promoted due to a low birthrate and aging population. Not only healthcare professionals but also the government and community resident networks are needed for supporting QOL.

For maintaining and improving QOL throughout the lifespan, good and universal services are required for health promotion, disease prevention, treatment and rehabilitation, non-infectious diseases, aging, and performance decline. Directly, this means health education based on pathological mechanisms, and a public health science procedure (prevention model) is often employed. It is to regulate risk factors that are related to health deterioration or that inhibit health maintenance. Physical therapists cannot intervene in the characteristic of age but should attempt to eliminate changeable factors if they induce a negative outcome (e.g., smoking) and add factors if they lead to health promotion (e.g., exercise habits). Support is given to groups, but the effect elevates by stratification or individualization according to the level of behavior changes achieved. In the future, physical therapists should be aware that a multimorbidity state will increase more, and the list of issues concerning the modes of impairments and performance decline as well as participation restrictions will become complex.

In addition, it is anticipated that as backgrounds surrounding the elderly, difficulties with decision making, an increase in people living alone (social isolation), solitary death, abuse by relatives, minor

crimes attributable to economic poverty, shrinking social security costs, and changes in one's view of life and death (wanting to give up fighting against a disease) frequently occur, thus physical therapists' ability to solve social issues will also be tested. Local living used to rely on informal care mainly by nearby relatives such as families, and social problems were properly managed by cooperation with and mutual aid by relatives and neighbors. Today, ties among residents have diluted, and informal care has weakened. In local regions, the reality is that the population of younger generations at the productive age is small, so knowledge about supporting residents who are likely to be left behind and dealing with differences in the degree of living hardships is required as well. A key to supporting QOL may be creating mechanisms of "self-help, mutual aid, mutual legal assistance, and public help" for each region.

The goal is to aim for a state in which individuals can have self-care and self-control. What should be contrived is that self-care and self-control are feasible, can be started today, can be expressed as concrete numerical values, have countermeasures if they are difficult, are decided by residents, are shared with specialists, and can be self-monitored.

Physical therapists need to have the ability to enhance and maintain physical, mental, and social viability necessary for the elderly and residents with performance decline to live a local life. Trying to solve phenomena caused by various factors, which is not just the issue of chronic diseases such as lifestyle diseases, may be a response to social demands.

4) Holding a health education class by physical therapists

As previously mentioned, it has been considered that health education is to support individuals, families, groups or local communities to master faculty to proactively work on health problems with which they are confronted." Health education is given as encouragement to promote health maintenance and has the aspects of prevention, early detection and early treatment, treatment, and rehabilitation. It is necessary that as a result of health education, the said parties make a habit of healthy living, are motivated to change their behavior, acquire the knowledge and skills necessary for the behavior change, and actually change their behavior.

There are a variety of entities and scales of holding health education classes: They may be held by local governments such as municipalities or as part of research by universities, research institutes or companies. The former is held by a community, such as a town or city, by persons in charge in the town or city in consideration of the health management of the townspeople and citizens. The latter is held to achieve the purposes of the sponsors (evaluation on the effect of intervention in the elderly population, discovery of monitors for new products being developed, etc.) and can be structured to accomplish the goals of the health education participants and beneficial for those who are participating in the next class reflecting research results. In many cases, not only physical therapists but also specialists such as physicians, nurses, health nurses, dietitians, and clinical psychotherapists are involved in holding them. This may be because intervention using specialized knowledge is required to achieve the aforementioned goal of health education.

"Behavior change," the goal of the health education class, alters according to the situation that patients/clients are in (including environment, personal background and concept of values). There are people who understand it as knowledge but are in an environment where they cannot reflect it in actual living or behavior, or do not intend to reflect it. Also, there are people whose living activities change (including changing in the wrong direction) without them realizing it and they do not understand the "behavior change" or have incorrectly perceived it. It is necessary to add that class participants (patients/clients) can voluntarily think, notice, and change their behavior. These changes, "behavior change," are expressed as five stages (precontemplation, contemplation, preparation, action, and

maintenance stages). Changes move from the precontemplation stage to the contemplation stage, and then to the next stage: What perspective is necessary for maintaining the behavior change.

The concept of self-efficacy is essential for encouraging a behavior change. Self-efficacy refers to an individual's belief in his or her capacity to execute necessary behaviors and a degree of confidence, and is a factor involved in the behavior change that is the goal of health education. People with high self-efficacy can be said to be more easily able to sense a benefit from the behavior change. Methods to increase this self-efficacy include (1) setting a simple topic/goal and gradually elevating it, (2) praising when the goal is attained, (3) presenting a role model, and (4) giving specific instructions.

Since physical therapists are specialists of perceiving human movements, they are often involved in health education classes from this viewpoint of movements. Physical therapists are expected to accurately analyze the patients/clients' movements and understand their current status and then advise the patients/clients on their future motor behavior, and continuously aid them.

However, it does not mean that it is fine to only observe physical "movements." As previously mentioned, there are not only the movements themselves but also a variety of matters that must be grasped: The psychological aspect of whether the patients/clients are willing (eager) to exercise; whether the patients/clients have understood appropriate exercise methods and the favorable and adverse effects of exercising; whether the patients/clients are in an environment allowing them to exercise; and what support they have from their family and surrounding people. After understanding these, physical therapists must prepare and provide the participants of a health education class with an exercise program for a group and personalized exercise programs, induce a behavior change, and be involved in maintaining the changed behavior.

(Yorimitsu Furukawa/ Kazuhiro Harada)

2. Physical Therapy in the Preventive Field
Current Status and Future Direction of Physical Therapy in the Preventive Field

1) Current status of physical therapy in the preventive field

The first demographic transition refers to the transition from high to low fertility and mortality with the modernization of society, whereas the second demographic transition is the transition from low fertility and high mortality to an equilibrium population level. The demographic transition in Japan was high fertility and mortality before the second world war to low fertility and mortality during Japan's economic boom, and then to low fertility and high mortality in 2008. This is associated with changes in disease structure, so the demographic transition is also called an epidemiological transition. Infection and perinatal disorders are issues in societies with high fertility and mortality, whereas non-infectious diseases such as lifestyle diseases are issues in societies with high fertility and low mortality or with low fertility and mortality. Also, geriatric syndrome/frailty, which can hardly be referred to as diseases but are declines in physical, mental and social function associated with aging, are issues for society with low fertility and high mortality. In addition, unlike diseases, no one can avoid death and aging (Wallace, 1992) so a manner of coping with them as things that should not be evaded but accepted, which is different from that for diseases in the past, is needed. This is similar to accepting disabilities. Under this circumstance, expectations are widely growing for the application of physical therapy, which specializes in the studies of function and impairment, to the people in the preventive field.

In order to meet such expectations, physical therapy has to undergo a paradigm shift to incorporate public health, preventive medicine, and knowledge on health promotion. For example, therapeutic medicine focuses on the negative aspect of diseases and is given according to a disease avoidance

model to detect and treat affected sites early, whereas preventive medicine and health promotion focus on the positive side of health and are carried out with the salutogenesis model to increase behaviors good for health as much as possible. The disease avoidance model that weighs importance on results is likely to change patients/clients' behavior, but when the importance of the result, that is health, is fundamentally low, it is difficult to induce a behavior change.

Antonovsky (1979) has stated that for transition to the salutogenesis model, it is important to use the sense of coherence that individuals have acquired in their lives to properly cope with a variety of stresses. Furthermore, Baltes (1990) has affirmed that instead of a negative concept such as stress, derivative events should be perceived as a factor promoting development of humans, and this development is unlikely to be affected by aging: so he stated the idea of life-span development. With the use of this salutogenesis model and the concept of life-span development for conventional physical therapy, instead of focusing only on the negative side of diseases or declining functions such as lifestyle diseases and geriatric syndrome, physical therapy in the preventive field, which can positively regard the current health condition as a result of adaptation by individuals, is needed.

With the aim of establishing such physical therapy in the preventive field, the Japanese Society of Physical Therapy for Prevention (JSPTP) was founded in 2016. The JSPTP has defined preventive physical therapy science as "a study to research physical activity including the prevention of the onset and recurrence of diseases, which may cause disabilities, and geriatric syndrome for the people to keep participating until the end of time." The areas of the study cover the elucidation of mechanisms, onset prediction, development of preventive methods, development of devices, creation of social activity, and drawing up of systems. This concept includes the creation of a society in which individuals can successfully acquire health.

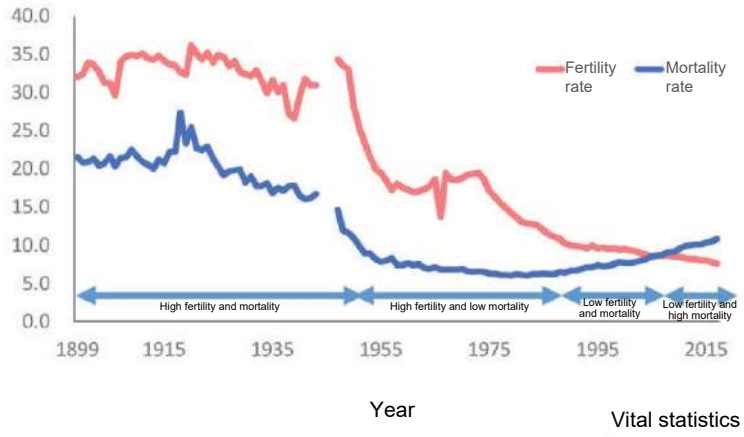

Figure 2 Trends in Fertility and Mortality Rates in Japan

2) Specificity of physical therapy in the preventive field

In preventive medicine, prevention is classified into prevention starting from the healthy state (primary prevention), prevention starting after having risk (secondary prevention), and prevention of progression and recurrence starting after onset of disease (tertiary prevention) according to the patients/clients. In this context, physical therapy equals tertiary prevention and has been playing a major role in preventive medicine. In the preventive field, physical therapy is subject to primary and secondary prevention as well. Hence, for physical therapy in the preventive field, the effect is validated when the knowledge of physical therapy accumulated for tertiary prevention is extrapolated to primary and secondary prevention, and preventive intervention at new personal, social, and personal x social levels on the basis of the salutogenesis model is studied and practiced. By the way, physical therapy is treatment, but the patients/clients of primary and secondary prevention are not those with

diseases so this term is inappropriate. For this reason, instead of treatment, intervention is used for physical therapy in the preventive field.

Physical therapy is therapeutic medicine, so evaluation of effects needs to be determined by a randomized controlled trial (RCT). This requires a premise that patients select a good therapy. In physical therapy in the preventive field, however, the patients/clients do not always choose a good intervention. The freedom of choice is greater compared with that for therapeutic medicine: The effect shown by an RCT does not mean the effect of the intervention. The product of the effect and the probability of selecting the intervention should determine the effect of the intervention. Therefore, even if confounding factors are less controlled compared with an RCT, study procedures, to which the effect of selection can be added, such as a propensity score method, is used for physical therapy in the preventive field.

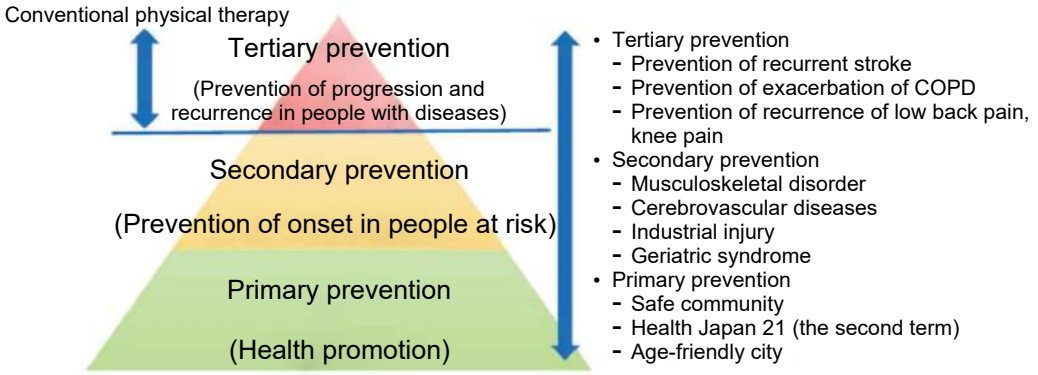

Figure 3 Difference between Physical Therapy Science and Preventive Physical Therapy Science. Examples of studies are presented on the right side.

Furthermore, "Action Research" has been gaining attention in recent years (Haga 2020). A characteristic of action research is that the patients/clients are also involved heavily in developing the research design. Conventional studies clearly divide those who intervene and those who are intervened upon. However, when intervention is at a social level, the patients/clients' encouragement to society is not ignorable. Thus, instead of ignoring it, adding the power of the patients/clients and anyone surrounding such people makes the intervention more effective and durable. The scientific validation of this research is still technically difficult, but the integration of advanced technologies, such as objective description of subjective activities by residents using artificial intelligence (AI), is also a characteristic of physical therapy in the preventive field.

3) Techniques required for the preventive field

In medicine, informed consent (IC) is considered to be critical. The actual circumstance is the process of a knowledgeable specialist explaining an appropriate treatment method to a patient to convince him/her. This effectively functions when the effect of treatment is reliable but is unlikely to function when there are two or more comorbid treatments or the effect is not definite but may be to some extent. In other words, when patients have broad choices that they can initiatively make, there are large limitations on IC. Shared decision making (SDM) is to replace IC because the super-aging society and many comorbidities make the extrapolation of the effect of treatment to the young generation difficult in a clinical study, and independent selection by patients is needed in recent years for terminal care, etc. This is exactly the technique needed for the preventive field. Since health behavior is an act that people choose by themselves, the technique of SDM is particularly important. For SDM, first, physical therapists must be aware that they are partners who select an intervention with the patients, then it is necessary to present an appropriate number of options, provide evidence

used as criteria for selection, and make agreements on the reevaluation of the selected intervention. Furthermore, regional SDM is required instead of personal SDM at a "community salon," etc. held by a regional community. It has been called regional normative integration: Instead of communicating the creation of a healthy living area downwardly from the government, it is necessary to develop a technology to perform an analysis with a community and form consensus on the modality of the community based on a fact-finding survey of living areas.

4) Creating a society where people want to be healthy

For making people want to be healthy in a super-aging society, the society wishing them to be healthy must expect the people to play new roles. The continuity theory in gerontological sociology holds that individuals want to maintain activities as they did when they were young if the given conditions allow. In contrast, the disengagement theory in social gerontology holds that the society exempts the elderly from obligations, leading the elderly to actively disengage from their roles. Of course, excessive role expectation damages motivation for health, but insufficient role expectation also impairs motivation for health. In the modern world, role expectation from society rapidly decreases after retiring from work or child rearing due to a nuclear family style of living and the gap between a domicile and workplace caused by highly developed economic structure. This is supported by the result of our mail survey in the urban elderly: While those with instrumental activities of daily living (IADL) disability accounted for 5.8% of those with effective answers, 51.9% answered that they had communication with a relative or friend less than once a week, showing that losing social interactions is more common than a decline in physical or mental function. Maslow (1943) states that for maintaining the need for self-actualization, the esteem-needs and need for social role must be satisfied. In the state that people cannot feel their social roles due to a lack of social interactions, it is natural to lose interest in health maintenance, which is the basis of self-actualization.

In other words, it is insufficient to attribute future health making only to individual effort, but a society where people want to be healthy until the end of time needs to be built. In particular, the embodiment of living in which people can feel their roles after retiring from work and child rearing is an urgent need. Fortunately, physical therapy has a proven record of community-based rehabilitation (CBR). By reevaluating this CBR and changing the objective from the dissemination of rehabilitation to the creation of a society where everyone wants to be healthy regardless of age or disabilities, this embodiment can be realized.

(Shuichi Obuchi)

3. Physical Therapy in the Administrative Field
Current Status and Future Development of Physical Therapy in the Administrative Field

1) What is the administrative field?

Administration is one of the elements of the so-called "separation of the three powers," i.e., "legislation," "judicature," and "administration," and it is the governmental authority to govern. "Administrative bodies" handling these are mainly divided into the government and local public authorities. The local public authorities include prefectures and municipalities as well as agencies operated by these, such as public health institutes and welfare offices. Civil servants employed by the government are called national government personnel, and those employed by local public authorities such as prefectures and municipalities are referred to as local service personnel. Laws that are handled by national government personnel and local service personnel differ, but all civil servants are in the position set forth in Article 15, Paragraph 2 of the Constitution: "All public officials are servants of the whole community and not of any group thereof." The Local Public Service Act states that they have a

mission: “Local service personnel serves for public interest as servants of the whole community.” Physical therapists employed by the administration are in charge of healthcare and welfare as having such a mission. In recent years, the number of physical therapists employed through the mode of outsourcing of business, teaching remuneration, and fiscal year employees (former temporary workers) as administrative services particularly from the municipalities has been increasing in addition to administrative full-time employees. Administrative services widely include physical therapy at municipal hospitals, municipal nursing care facilities, and nursing facilities. Here, I describe physical therapy at administrative bodies such as prefectural governments, municipal offices, welfare offices, health centers, and public health institutes, excluding therapeutic acts at medical, nursing care, and welfare facilities.

2) Current status of physical therapy in the administrative field

The characteristic of physical therapy in the administrative field is not physical therapy as a therapeutic act for individual patient/client but is mainly management operation. It is defined as “to aid individuals or a whole community to be able to voluntarily work on health making and preventive health care for the elderly, grasp local issues, draw up a plan for solutions (operations), assess results, and develop social resources necessary for solving these issues regardless of the age of the patients/clients and the presence or absence of disabilities” (“Role function of administrative physical therapists and occupational therapists” with modifications prepared in the “Study on effective business development with involvement by administrative physical therapists and occupational therapists,” an FY 2009 Community health comprehensive promotion project).

Physical therapy in the administrative field has five role functions as shown in Figure 4.

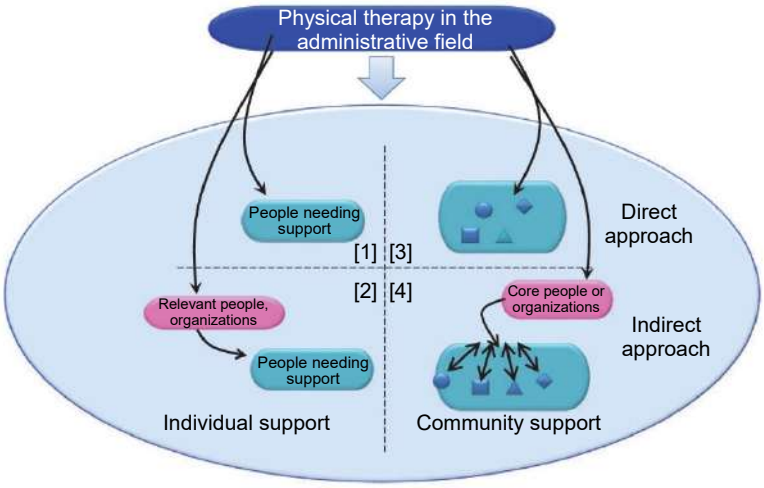

Figure 4 Role Function of Physical Therapy in the Administrative Field The report of “a study on effective business development with involvement by administrative physical therapists and occupational therapists,” an FY 2009 Community health comprehensive promotion project, with modifications

Each function is as follows: (1) Individual support/direct approach: This is the implementation of direct physical therapy (e.g., functioning/physical function assessment for preventive health care for the elderly) involving “individuals” and a consultation activity, including approaches (fall prevention class, low back pain improvement class, etc.) to involve “individuals” as the target and a “group” as a means; (2) Individual support/indirect approach: This is an operation (e.g., advice on a plan at individual community care meetings) to indirectly support “individuals” to aid the applicable “individual” supporters or teams instead of direct operations; (3) Community support/direct approach:

This is an operation to directly intervene in "organizations," 'groups," etc. having common needs to support their community making (e.g., course on demand as support for launching a community salon). This includes not only specific groups such as "XX Group" but also the creation of a whole community or regional network; (4) Community support/indirect approach: This is an operation to indirectly support residents voluntarily develop community making through involvement in a "core" group or person (e.g., the leader of preventive health care for the elderly, the president of a club for the elderly) of the region (e.g., course for an officers' meeting such as a meeting of residents' association presidents). This includes not only specific groups such as "XX Group" but also the creation of a whole community or regional network; and (5) Establishment of a plan, operation management, etc.: This is a production-like operation to examine a community based on the involvement in the abovementioned four role functions and investigation, execute the project based on them, establish and evaluate plans at various levels involving the entire community, launch new projects, and manage outsourcing.

For these five role functions, their operations exist on an equal footing as shown in Figure 5.

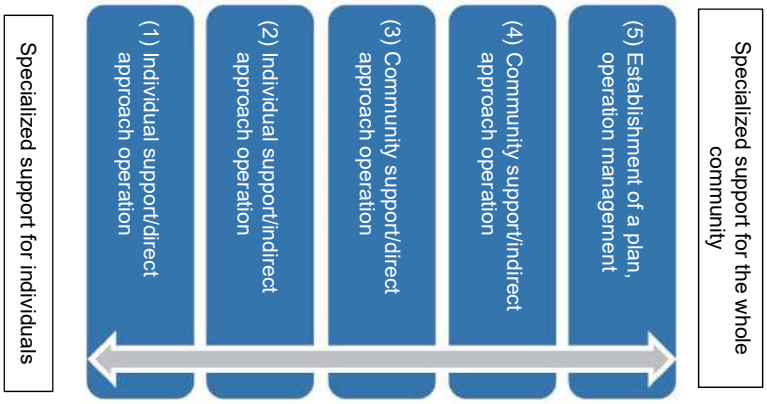

Figure 5 Flow of the role functions of physical therapy in the administrative field The report of "a study on effective business development with involvement by administrative physical therapists and occupational therapists," an FY 2009 Community health comprehensive promotion project, with modifications

3) Operations related to physical therapy in the administrative field

There are a variety of operations related to physical therapy in the administrative field. The contents of operations vary according to the population size such as government-designated cities and core cities. In recent years, the flow of transition from the prefectural governments to local governments has been accelerated, and the larger the population size, the stronger the tendency to transfer administrative affairs of the prefectural governments. Under the circumstances in which administrative personal and operations are reduced, operations engaged by specialists such as physical therapists have been tended to be outsourced from direct management by the administration to private sectors as entrusted business.

The main operations of physical therapy in the administrative field can be classified into five areas.

(1) Area concerning children (e.g., infant health examination project, home-visiting consultation operation, technical support for other job types at related facilities, and planning nurturing and mother-child policies)
(2) Operations concerning persons with disabilities (e.g., operation related to assistive device distribution project, daily supply provision project, disability determination investigation operation, physical disability certificate distribution project, job assistance operation, local service adjustment-related activity, and planning of welfare policies for persons with disabilities)
(3) Area concerning the elderly (e.g., project for preventive health care for the elderly,

comprehensive support project, operation for investigating the certification of care need, operation for the committee for certification of need, planning of welfare policies for the elderly)

(4) Area concerning health making (e.g., specific health guidance, operation for building awareness of health making, and planning a health making policy)

(5) Others, role to coordinate rehabilitation resources: Local rehabilitation coordinator (including countermeasures against disaster), industrial area (e.g., work environment arrangement), building and civil engineering area (e.g., making accessible buildings and roads), educational area (e.g., prevention of sports disorders and health checkup at school), etc.

4) Future development

As for future development, projects for integrated implementation of public health programs with preventive health care for the old-old, and a multi-layered support system development project to promote community making to realize a community cohesive society as a deepening of community-based integrated care system may be developed in regions. A project for integrated implementation of public health programs with preventive health care for the old-old, cooperation among three areas in charge of health insurance for the old-old, health making, and preventive health care for the elderly is needed. The multi-layered support system development project is applicable to all generations from infants to the elderly and requires cooperation among all of the aforementioned areas of physical therapy in the administrative field.

For future physical therapy in the administrative field, it is necessary to understand an entire community from more diversified perspectives than ever, have the ability to plan projects suitable for the actual conditions of communities, and to develop the projects: Management and coordinating capacities. The basis is a capacity for gathering information. As well as analyzing quantitative data (which are numerical data for example, statistical data such as vital statistics, and questionnaire survey results) and qualitative data (e.g., frank opinions of residents such as prior review, interview, social gatherings as well as what the secretariat and responsible persons usually feel) to grasp the actual conditions of communities, the ability to extract regional topics, and plan and execute measures for solving the topics is necessary for physical therapy in the administrative field.

In the medical and nursing care fields, patients/clients receiving physical therapy by physical therapists may have some knowledge of physical therapy, but there are many residents who do not even know the phrase “physical therapy” in operations related to physical therapy in the administrative field. This is also the case for administrative staff. This point is specificity of physical therapy in the administrative field. However, being able to be involved with many residents from the stage where physical therapy as treatment has not yet been needed and to increase the recognition of physical therapy are also specificities of physical therapy in the administrative field. I expect that more physical therapists are engaged in physical therapy in the administrative field and thereby physical therapy is recognized widely and properly by the people.

(Nobuko Ohsaka)

4. Physical Therapy in the Industrial Field Current Status and Future Direction of Physical Therapy in the Industrial Field

1) Current status of physical therapy in the industrial field

(1) What is physical therapy in the industrial field?

Physical therapy in the industrial hygiene field is referred to as industrial physical therapy. Currently in Japan, no definition of industrial physical therapy has been determined. The industrial hygiene field is based on the Industrial Safety and Health Law. This Law is intended to promote the prevention of

health problems and its maintenance with basic concepts to manage three areas: Health, working environment, and work.

(2) Current status of industrial physical therapy

Physical therapists are extremely rare in an environment where they can give guidance on physical activity and daily life, including instructions on work environment improvement and management systems to ameliorate health problems of workers while they are on duty at a hospital. The Industrial Safety and Health Law stipulates that only one industrial doctor and one health supervisor shall be designated at a workplace with ≥ 50 employees. Not only are physical therapists and other specialists not specified to be appointed in the Law, but also physical therapists are not included among the members composing of this field, while industrial doctors, dentists, nurses, health supervisors, labor and social security attorneys, and industrial health consultants are included.

(3) Industrial physical therapy in foreign countries

In the US, Australia, and Holland, which are industrially advanced countries, industrial physical therapy has been established. Exercise guidance for the prevention of industrial injury, ergonomic assessment of work posture, and instructions to improve the motor function of older workers are carried out, and their results are recognized by the people. The mode of industrial physical therapy is a contract between a physical therapist office in practice and a company in the majority of cases, but some companies directly employ physical therapists (Figure 6).

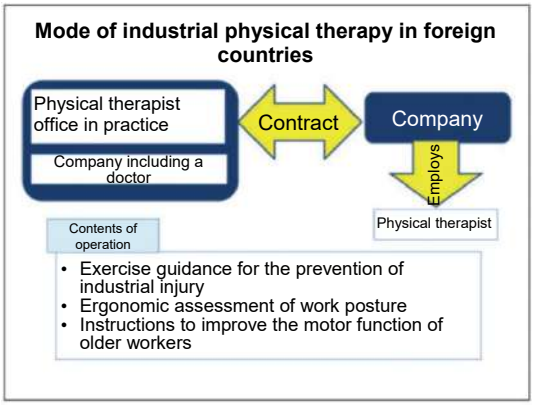

Figure 6 Mode of Industrial Physical Therapy in Foreign Countries

(4) Establishment of the Section of Physical Therapy in Occupational Health in the Japanese Physical Therapy Association

In the Japanese Physical Therapy Association (JPTA), the Japanese Society of Physical Therapy and its subordinate agencies consisting of 12 subcommittees and five sections were established in 2013. The Section of Physical Therapy in Occupational Health was included as one of them.

2) Potential of physical therapy in the industrial field

(1) Contribution to health and productivity management and work-life balance support

"Health and productivity management" are to strategically implement health management from the viewpoint of business management based on the concept that efforts in maintaining and promoting employees' health are investments to increase profits in the future. The expected effects of health and productivity management may be improvement of the working environment, amelioration of the company image, and disease prevention measures, and active involvement in the health maintenance and promotion of employees may be essential for the continuous development of companies in the future. Health consultation, support for health screening, aid for cancer screening costs, reduction in total work time, smoking measures, and harassment education are worked on mainly by industrial

doctors and public health nurses. In the future, establishment of schemes to manage data on health conditions and living habits and efforts in the visualization of health and productivity management have to be initiated. “Work-life balance support” is one of the important efforts in Japan’s Plan for Dynamic Engagement of All Citizens by the government; because the aging of workers and the number of people working while having diseases are anticipated to increase, the administration has been asking companies for support. In recent years, it has been included in key words in the industrial hygiene field. Physical therapists, who have a strong point in functional evaluation, are expected to actively participate in this field in terms of these two key phrases, “health and productivity management” and “work-life balance support.”

(2) Contribution to the primary preventive field

The “Physical Therapists and Occupational Therapists Act” (Law 137) established in 1965 limited that physical therapy would be applicable only to people with physical disabilities. After time passed, it is a known fact that a revolutionary notification was issued by the Health Policy Bureau, Ministry of Health, Labour and Welfare in November 2013 regarding the use of the name of physical therapists: “Physical therapists may perform operations in a scope not corresponding to assistance of medical care such as guidance on fall prevention to people without physical disabilities in the services of preventive health care for the elderly. When performing such operations other than physical therapy, there is no problem with using the name of physical therapists. In addition, when carrying out such operations in a scope not corresponding to assistance of medical care, no instruction of physicians is required.” Today, the government’s policy and needs when implementing preventive physical therapy are specified. Hence, physical therapists must aim to be recognized as specialists who can contribute to health management of not only people with disabilities but also those who are at risk of disabilities by accumulating the intervention effects through involvement.

Under the circumstances that almost no health supervisors with ergonomic knowledge have actually been nurtured, the fact is that physical therapists, who have knowledge of body function and ergonomics, are expected to acquire knowledge on safety and health, and exert the specialty and initiative.

(3) Contribution to the society of older workers

The continued employment system set forth in Article 9 of the revised Law Concerning Stabilization of Employment of Older Persons obliges employers to raise the retirement age and introduce systems such as the introduction of the continued employment system. With the use of this system, physical therapists may well be able to contribute to ensuring maintenance of the labor population by evaluating the motor function of middle-aged and elderly persons who wish to work and giving guidance to promote the employment of middle-aged and elderly persons (Figure 7). Merits gained from employing the elderly are suggested to be not only merits for the elderly themselves but also a reduction in medical costs as a result of continuing work. In addition, to inhibit the elderly who are capable of working from working leads to an increase in burden of intergenerational support.

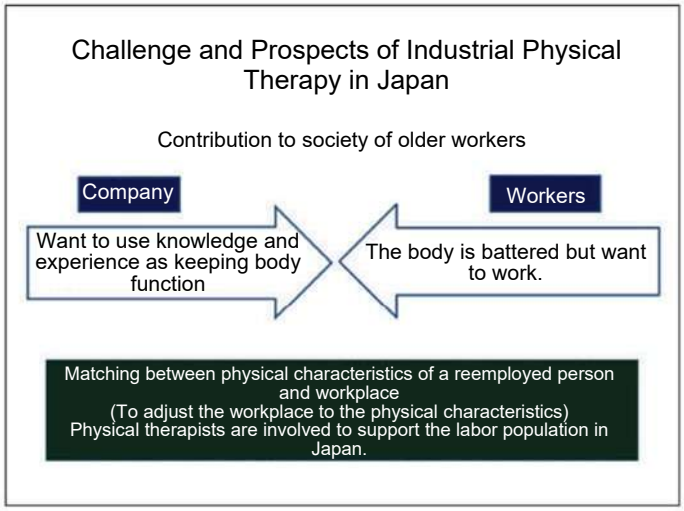

Figure 7 Contribution to the Society of Older Workers (Draft)

3) Future direction of physical therapy in the industrial field

Regarding health and productivity management, companies' care for their employees' health will be very important for company risk management, and ergonomic hygienic management may be considered to be effective from the standpoint of productivity enhancement. Furthermore, the handling of companies with less than 50 employees may be reexamined. If physical therapy can be recognized in this field, it can contribute to solving inherent social issues such as aging society, labor shortage, and an increase in social insurance premium as well as to expanding the working area of the whole society. Then, why has industrial physical therapy still not become common? This is because (1) no business model has been established; and (2) no intervention results have been accumulated (Table 2). In other words, a platform for disseminating physical therapy in the industrial field in Japan needs to be established. As for the direction of platform establishment, the World Wide Web (WEB) and digital technologies must be actively used as means of facilitating recognition and spread. It may be necessary to build a system through which physical therapists can remotely give support. By adopting a subscription-type business model, accumulation of data on intervention effects, a results feedback function, questionnaire surveys, market analyses, and thinking about work style from a different angle may be necessary. The use of the WEB and digital technologies has been found to be the optimal way of raising awareness about physical therapy and disseminating its expertness, so establishing a systematic system to use and education on rules for its use are urgent needs. Since activities in the industrial field require having the viewpoint of society as a whole, it is an area that current pre- and post-graduation education cannot shoulder. The necessity of education in this field is expected to grow.

Table 2 SWOT Analysis of Physical Therapy in the Industrial Field

Strength	Weakness
• Expert skills (physical assessment, ability to analyze work environment) • Thorough knowledge on disease treatment • Exercise guidance according to symptoms • Easily cooperating with other job types • Validation of the effect of intervention using statistics • Distribution route through a network of connections	• Overwhelming lack of results of the effects of intervention in the field concerned (overwhelming lack of studies and papers) • Overwhelming lack of work experience in the field concerned • Low recognition of physical therapists in the field concerned • No established intervention model/system • Time constraints of physical therapists, side business for the time being? • Insufficient pre- and post-graduation education
Opportunity	**Threat**
• Arrival of society of older workers (introduction of system to raise the retirement age) • Increase in awareness of health and productivity management (effort is companies' mission.) • Increase in the needs of efforts in the reform of working practices • Increase in the needs of efforts in productivity enhancement (limitation of hygienic management only by staff physicians?) • Increase in telework due to the COVID-19 pandemic, a lack of communication among employees, elevation in health injuries • Acute advancement of communication technology (5G, DX, etc.)	• Poor company performance • Participation of other professions and job types • Repellence by existing professions

"What can we do to contribute to society?" – It is only by continuing to strategically challenge that we can raise awareness about and entrench industrial physical therapy

(Shigeto Yamazaki)

5. Physical Therapy in the Scholastic Field Current Status and Future Development of School Health, etc.

1) What is school health?

School health is literally "to protect (maintain) health" at school. Health services are activities to master culture and climate related to health promotion, health awareness, and disease prevention at a social organization (e.g., groups by age and local community). In other words, school health is an activity allowing mastering of culture and climate related to health promotion, etc. at school. Hence, because school health is a health service (social work and cultural program) at school, which is a place of educational business, it is desirable to develop it through deepening various discussions by involving not only a single profession but also various other professions and people in general.

According to the School Health Safety Law, school health is intended to stipulate the matters necessary for health management at school to maintain and promote the health of its pupils and staff, and to specify the matters necessary for safety management so that educational activities at school are carried out in a safe environment ensuring the safety of pupils, thereby contributing to the smooth implementation of school education and securing results. The methods include the following:

(1) Establishment of a school health plan
(2) Standards for school environmental health
(3) School infirmary

(4) Health consultation, etc.
(5) Health guidance
(6) Collaboration with local medical institutions, etc.
(7) Health checkup
(8) Prevention of infection

Of these, health guidance is stipulated in order to understand the mental and physical condition of pupils on a daily basis, and when a health problem is identified, to give necessary instructions without delay and advice to their guardians as needed. Health checkup is specified to prevent and treat disease or instruct treatment based on its results, and appropriate measures such as exercise and reducing work shall be taken. In addition, health checkup includes health checkups of pupils and staff while attending school. Article 14 of the School Health Safety Law stipulates that appropriate measures such as intervention and exercise for disease prevention based on health checkup results should be taken. Furthermore, the Enforcement Regulations of School Health Safety Law specify prevention and treatment of disease and guidance after health checkups.

The potential for physical therapy to contribute to prevention and health promotion in the field of school health includes a healthcare model for being involved in health consultation and guidance and aftercare for health checkup, and an education model to give health education and guidance and for raising awareness. Physical therapists are specialists that eliminate problems extracted from physical therapy assessments in people with a decreased ability of basic activities or functioning due to diseases, trauma/disabilities, aging, etc., and those who are at risk of such, and seek to maintain/improve and ameliorate body functions including motor function and the ability of basic activities. At school, physical therapists are expected to actively participate in both the healthcare and education models for exercise guidance and prescription, and give movement guidance to not only people with abnormalities with musculoskeletal disorder, respiratory or circulatory organs, or metabolic function, cerebral paralysis, developmental disorder, etc. but also to healthy pupils and school staff.

This paper addresses a wide range of activities for pupils and staff at school without dividing physical therapy in the scholastic field into regular classes and special needs education, from the viewpoints of prevention and health promotion using the skills of physical therapists at school, in light of the purport of this chapter, i.e., physical therapy in the field of prevention and health promotion.

2) Physical therapy for school health (methods and types)

There are two types of example cases where physical therapists work on health management at a school site in collaboration with a school physician, health and physical education teacher, and nursing teacher: They are involved with a sport department, or involved with the “school” without being limited to the sport department. In the case of involvement with a sport department, a physical therapist is positioned between a coach and pupils and their guardians, and explains the health condition of the pupils to the coach, provides information helpful for improving the safety and competition power of the pupils, and actually gives guidance to the pupils. For the pupils and their guardians, the main activity of the physical therapist is to reduce their fear of injury (Figure 8). In contrast, in the case of broad involvement with a school, through collaborating with a school physician, nursing teacher, and health and physical education teacher, the physical therapist may be involved in the health management of pupils and school staff with the use of his/her specialized knowledge such as physiology and kinesiology. Specifically, this is the implementation of health education and exercise guidance based on the school physician’s instruction, advice for consultation from the nursing teacher, and health and physical education teacher, and cooperating in collaborative activities (Figure 9).

At a school site, physical therapists are anticipated to be able to use their skills as follows:

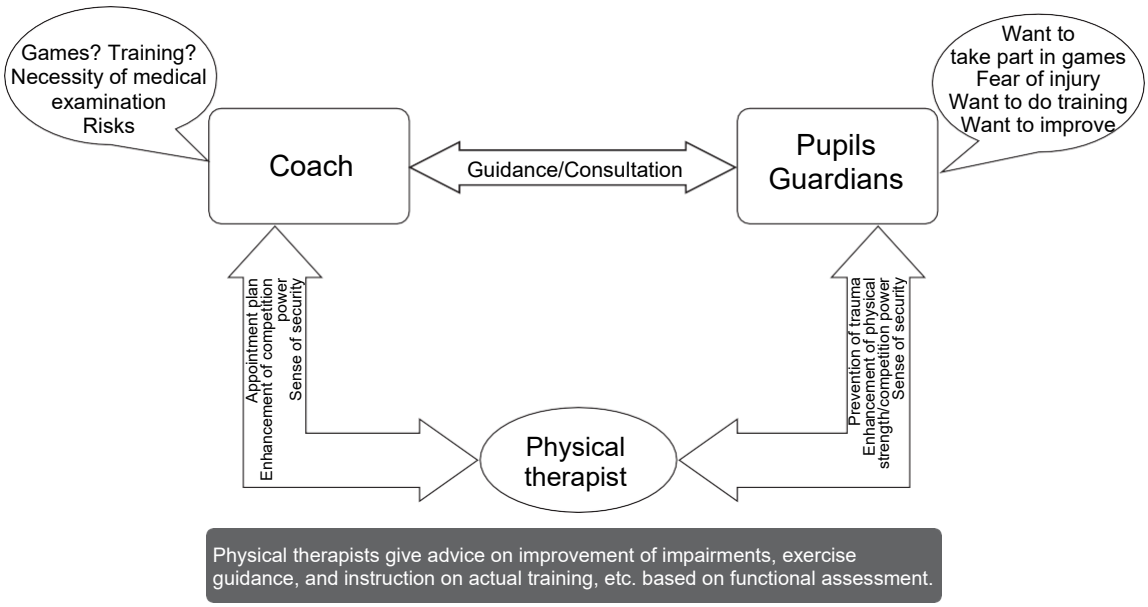

Figure 8 Role of Physical Therapists in the School Sport Department

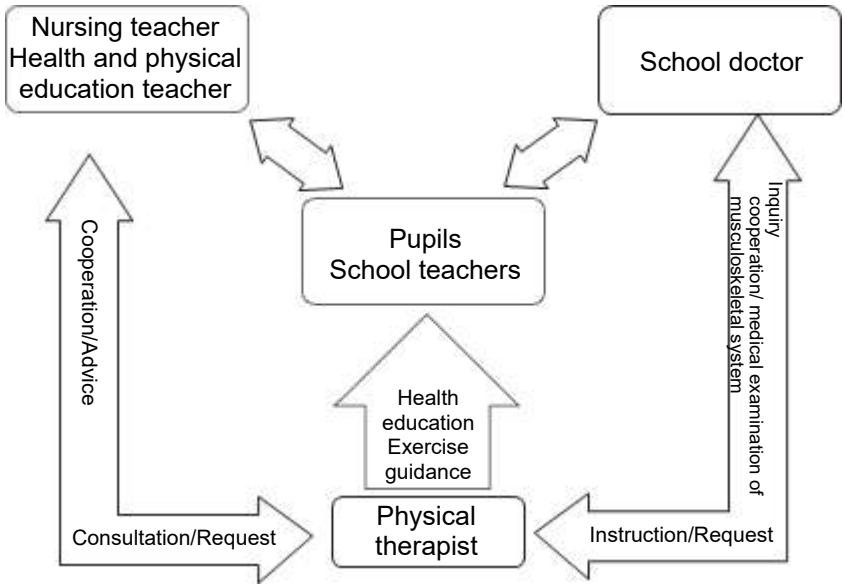

Figure 9 Role of Physical Therapists at School

(1) Actions and prevention of trauma and disabilities during classes such as physical education and club activities
Direct actions for trauma and disabilities in learning activities, medical check and exercise guidance for students, education contributing to the prevention of injury, and the like

(2) Improvement of lifestyles (obesity measures)
While taking account of the social environment surrounding students such as the popularization of smartphones and gaming devices, involvement in reducing habits of not exercising by making students, etc. realize the joy of exercising through exercise experience, etc.

(3) Fitting of desks, chairs, and shoes
As a specialist of posture and movement, actions such as raising awareness about the adverse

effects (e.g., deterioration of posture, learning effects, and various musculoskeletal malfunctions) of desks or chairs not fitting the physical size and the relationship of musculoskeletal abnormalities such as the foot region, e.g., slippers, gym shoes, the size of shoes worn for exercising, the strength of cushioning properties, and way of wearing shoes (stepping on the heels, etc.)

(4) Exercise prescription and health management for students with medical conditions (e.g., cardiovascular deformity and renal disease)
Guidance and advice on the appropriate amount and method of exercise after various professionals have decided a safe and effective amount of activities for students with medical conditions (e.g., physical education activities) in collaboration with a primary physician, school physician, nursing teacher, health and physical education teacher, and others instead of a choice between "doing" and "prohibiting" exercising

(5) Advice (risks and effects) on the selection, arrangement, etc. of playground equipment and exercise machines
Contribution to practicing (experiencing) safe and effective physical activities by selecting the types and sizes of various playground equipment and instruments used for exercising (physical activities) and thinking out their arrangement in the school

(6) Measures after medical examination of musculoskeletal system
Follow-up of students who were suggested to have abnormalities, and guidance, education, etc. contributing to the prevention of musculoskeletal abnormalities based on the usual posture and manner of exercise to pupils in whom no abnormalities were detected

(7) Health education
Education on items such as the body, posture, movement, and injury

(8) Individual and group lessons
Direct instruction on improvement and prevention of worsening to pupils with abnormal health conditions, and guidance to groups such as classes and grades

(9) Mental health
It is a known fact that exercising has a good effect on mental health. Physical therapists may be involved in mental health with exercise as a keyword.

(10) Health management and promotion (disease prevention) of school staff
Actions for musculoskeletal disorders such as low back pain, lifestyle diseases, mental health, etc.

3) Future direction

In collaboration/cooperation with stakeholders, namely the school physician, teachers (particularly the nursing teacher and health and physical education teacher), assistant principal, principal, and guardians (parents), activities contributing to the health promotion of pupils are required at school. In addition, information sharing and cooperation with the board of education, prefectural governments, and municipalities are also important. In order for physical therapists to operate in the scholastic field, it is crucial to encourage each stakeholder to understand the skills of the physical therapists and properly act in close cooperation with various professionals. Physical therapists in the scholastic field can do activities in the healthcare model and in the education model based on instructions of the school physician and in cooperation with the school physician and nursing teacher.

As for a career plan and self-improvement into human resources who can actively participate in a school setting, it is first essential that physical therapists learn about the "school." Physical therapists becoming involved in the scholastic field is not only for the purpose of transferring their workplace from a healthcare setting to a school; physical therapists must reinforce the perception that their purpose is to create a climate and culture that aids in nurturing healthy children and leads to health promotion throughout life up to preventive health care for the elderly, which is the educational and

social significance of school health. Schools are places of education, and professionals coming into contact with children are required to have not only specialized knowledge and skills but also to be refined human beings with life experience. It is necessary to produce and nurture human resources who can achieve such educational and social significance as well as enhance self-improvement and life experience to realize it.

(Shinichi Daikuya)

6. Physical Therapy in the Field of Women's Health Current Status and Future Development of Physical Therapy in the Women's Field

1) Physical therapy in the women's field

Physical therapy in the women's field is applicable to a variety of women such as musculoskeletal dysfunctions in perinatal women, pelvic floor dysfunctions in middle-aged women, sports disorders in female athletes, osteoporosis in postmenopausal women, and lymphoedema in women who underwent surgery for breast cancer or gynecological cancer, and it is needed throughout all stages of a woman's life.

(1) Musculoskeletal dysfunction in perinatal women

A musculoskeletal dysfunction representative of perinatal women is low back/pelvic girdle pain. The alignment of the spine and pelvis of women change due to pregnancy and childbirth, and child-rearing activities after delivery increase the burden on the lumbodorsal muscles. Low back/pelvic girdle pain is known to affect postnatal depression, and a leave of absence for active intervention of physical therapists is expected. When intervening for perinatal women, physical therapists must have a thorough knowledge on the physiological changes in the body associated with pregnancy and childbirth.

In addition, women have had remarkable full participation in society in recent years; many women return to work after childbirth. Good health condition is essential for women to work while raising children after pregnancy and delivery. For this reason, aid from a preventive standpoint may be necessary. Not only support to improve decreased musculoskeletal function that occurred before and after delivery is required, but also intervention that takes into account the psychological burden anticipated when reintegrating into society.

(2) Pelvic floor dysfunctions in perinatal or middle-aged women

Pelvic floor dysfunctions such as urinary incontinence, pelvic organ prolapse, and sexual impairment occur in not only middle-aged women but also young perinatal women, and they have been known to significantly affect the QOL of women. Numerous studies have reported that physical therapy for pelvic floor dysfunctions is useful for improving these symptoms, and it is considered to be one of the specialized areas of physical therapists.

(3) Sports disorders in female athletes

In recent years, female athletes play remarkably active roles, and some of them are globally active from an early age. One of the reasons may be that training suitable for individuals is performed based on scientific evidence. However, because female athletes are likely to face physical, mental, and environmental changes, actioning these changes is also an issue for continuing athletic sports. The female athlete triad is known to comprise "functional hypothalamic amenorrhea," "osteoporosis," and "eating disorder (lack of available energy)." The onset of the female athlete triad may affect female body development, so it is necessary to fully understand these symptoms and prevent their onset. For the modality of support for female athletes, studies have been undertaken and comprehensive and strategic efforts have been made. In order to aim for a high level of exercise performance from a

young age, conditioning not only the musculoskeletal system but also the endocrine system is important. Because abnormalities in menstruation due to a decrease in body fat may occur in female athletes, support for preventing abnormalities in menstruation associated with excessive exercise is necessary.

(4) Osteoporosis in postmenopausal women

Japanese women were reported to have an average life expectancy of 87.45 years (Ministry of Health, Labour and Welfare) in 2019, and thus Japan is a super-aging society. The average age of menopause in Japanese women is reported to be 49.47 years (Tamada, et al. 1995), so the duration of postmenopausal life is nearly 40 years. In postmenopausal women, bone density acutely decreases due to reduced estrogen secretion, frequently causing osteoporosis. In order to prevent osteoporosis resulting from bone fractures and extend healthy life expectancy, it is necessary to monitor bone health and make an effort to provide therapeutic exercise to maintain and improve bone density and fall prevention. In addition, it is important to do an appropriate amount of exercise throughout life from childhood through to adulthood and the elderly years to maintain bone density. Physical therapists may participate in the prevention and intervention of osteoporosis in all life stages.

(5) Lymphoedema in women who underwent surgery for breast cancer or gynecological cancer

Lymphoedema occur in the arms and trunk (chest and back areas) in women who underwent breast cancer surgery, particularly with axillary lymph nodes dissection, and in the lower body below the umbilical region in women who underwent gynecological cancer surgery with pelvic lymph nodes dissection. The treatment of lymphoedema is referred to as “complex physical therapy” and includes [1] skin care, [2] manual lymphatic drainage, [3] compression therapy, and [4] therapeutic exercise under compression. In recent years, it has been called “complex treatment” by adding [5] daily living guidance to these.

2) Current status of physical therapy in the women’s field in Japan

Physical therapy in the field of women’s health is expanding from individual activities to organizational activities. In 2016, the Section on Women’s and Men’s Health, Japanese Society of Physical Therapy was established. The number of members registered in this division has increased and was 5,977 as of July 2020.

(1) Musculoskeletal dysfunction in perinatal women

For cases such as low back/pelvic girdle pain, physical therapy can be provided as musculoskeletal rehabilitation under health insurance treatment. In recent years, the number of physical therapists engaged in rehabilitation in perinatal women in cooperation with obstetricians/gynecologists has been growing.

(2) Pelvic floor dysfunctions in perinatal or middle-aged women

Health insurance treatment is not yet applicable to physical therapy for pelvic floor dysfunctions, and very few medical institutions are actually providing rehabilitation as a healthcare service not covered by insurance. In the FY 2016 revision of medical service fees, an “independent voiding guidance fee” was newly established. Institutional criteria for calculation specify forming a voiding care team composed of physicians, nurses, and physical therapists/occupational therapists to engage in care for patients by various professionals. With this opportunity, in recent years, the number of physical therapists involved in rehabilitation for pelvic floor dysfunctions is gradually increasing.

(3) Sports disorders in female athletes

Physical therapy for sports disorders in female athletes has been practiced. However, there are few physical therapists who are involved in guidance on posture during exercises and training instruction for the prevention of diseases that frequently occur in women, such as anterior cruciate ligament damage. Furthermore, measures to terminate the chain of the female athlete triad are necessary. To do

so, self-care is needed to regulate the menstrual cycle, but there appears to be few physical therapists who are proactively performing activities to prevent fatigue fractures associated with osteoporosis in medical institutions. There is an opinion that support is needed for students who do strenuous exercise during extracurricular activities at junior and senior high schools, so it is preferable to implement an approach for women at the age of puberty in school education in the future.

(4) Osteoporosis in postmenopausal women

The Japanese Guideline for Prevention and Treatment of Osteoporosis 2015 Edition published in 2015 states that in a systematic review or meta-analysis of therapeutic exercise for osteoporosis, increasing the bone density of postmenopausal women is rated Recommendation Grade A, recognizing that intervention for postmenopausal osteoporosis is a critical item. Resistance and muscle strengthening exercises, aquakinetics, balance exercises, impulsive motion, mixing motion, etc. have been reported as therapeutic exercises for osteoporosis. In reality, however, it is difficult for general middle-aged and elderly persons to self-manage the implementation of therapeutic exercise, and it has been suggested that guidance and management by physical therapists, etc. are essential. In recent years, opportunities for physical therapists to play their roles are not just for secondary prevention at medical institutions, but have been expanding to primary prevention for local residents.

(5) Lymphoedema in women who underwent surgery for breast cancer or gynecological cancer

The number of opportunities to give physical therapy has been growing for impairment after mastectomy in breast cancer patients and after surgery in gynecological cancer patients. The calculation of a "rehabilitation fee for cancer patients" established in 2010 was limited to, for example, breast cancer patients "who were admitted to the hospital and will undergo or underwent mastectomy with lymph node dissection during hospitalization and may develop movement disorder of the shoulder joints after surgery." Nonetheless, in the FY 2020 revision of medical service fees, restricting calculation according to cancer types, treatment methods, severity, etc. was eliminated. Furthermore, a "complex treatment fee for lymphoedema" was newly included in insurance coverage in 2016. In a lymphoedema outpatient unit, which is recommended to be established mainly in cancer base hospitals, physical therapists have also been permitted to provide medical care that can be calculated for the lymphoedema guidance fee and complex treatment fee for lymphoedema for cancer patients. Hence, the number of opportunities for physical therapists to get involved with patients with breast cancer and gynecological cancer may further increase.

3) Current status of physical therapy in the women's field in foreign countries

In Western countries, physical therapy in the women's field has been recognized as an area of expertise and actively intervenes in treatment. One of the World Physiotherapy subgroups is the International Organization of Physical Therapists in Pelvic and Women's Health (IOPTPWH). The IOPTPWH specifies that its mission is to "improve health care internationally through facilitation and promotion of best-practice of pelvic and women's health physiotherapy." After the IOPTPWH was formally recognized as a subgroup at the World Physiotherapy Congress (Yokohama) in 1999, Japan also became a new member in 2019, and it has become a subgroup in which 30 countries participate. Forming close cooperation with the IOPTPWH member countries in the future may be a significant driving force to bring physical therapy in the women's field in Japan to a level equivalent to global standards. The IOPTPWH was formally called the International Organization of Physical Therapists in Women's Health (IOPTWH), but because physical therapy is also applicable to pelvic floor dysfunctions in men and children, the name has been changed to the International Organization of Physical Therapists in Pelvic and Women's Health (IOPTPWH) since 2019. Such an international trend suggests the importance of developing physical therapy in not only the women's field but also the men's field in the future.

4) Future prospects of physical therapy in the women's field

The Section on Women's and Men's Health conducted a survey among its registered members in 2019. The results revealed that the number of members who underwent training on physical therapy in the women's field was limited, and many responders wished to learn basic knowledge. Hence, a topic for this field is to spread its knowledge to many physical therapists. To do so, it is necessary to provide more study opportunities by holding training workshops, etc.

In addition, evidence reflecting the circumstances in Japan needs to be established in the future. Basic data obtained so far are mainly from implementation in Western countries, so there may be differences in physical constitution and social systems. Understanding the disease conditions in line with the current status in Japan and searching symptom analyses, evaluation methods, and treatment methods may lead to the provision of effective physical therapy.

In recent years, countermeasures for symptoms and diseases specific to women have been organized. In contrast, diseases unique to men have not been sufficiently focused on. A disease specific to men is prostate cancer, and therapeutic exercise is carried out for urinary incontinence after prostatectomy in Western countries. Physical therapy for men's health should be promoted to improve the maintenance of men's QOL.

Clinical settings are necessary for physical therapists with knowledge in this field to provide patients who actually have problems with physical therapy. To secure the clinical settings, understanding professionals in other fields is essential. At present, the independent voiding guidance fee and cancer rehabilitation fee, etc., can be calculated for health insurance, but the scope is limited, and some physical therapy is provided as a healthcare service that is not covered by insurance. In order to provide physical therapy more widely in this field, it is desirable to expand the scope of fees calculable for health insurance and get involved with patients as a member of a medical team.

(Ayako Yamamoto/Tomoe Inoue)

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MATERIAL

What you will learn in this chapter

This chapter addresses the knowledge and philosophy necessary for physical therapists to deepen your understanding; i.e., ethical issues (bioethics, medical ethics, and professional ethics), physical therapy management (safety management and crisis management measures) as well as the International Statistical Classification of Diseases and Related Health Problems, the International Classification of Impairments, Disabilities and Handicaps, and the International Classification of Functioning, Disability and Health.

1. Physical Therapy and Ethics

Ethics (life, medical, occupational and research), management (medical safety, prevention of medical accidents, infection prevention measures, personal information protection, and Personal Identification Law) as well as the International Classification of Impairments, Disabilities and Handicaps (ICIDH) and International Classification of Functioning, Disability and Health (ICF) are important for healthcare professionals to have knowledge in. This chapter therefore summarizes them as material.

1) Bioethics

Ethics is social regulations and rules accumulated from "the right conduct of people or reversely the wrong conduct of people." Ethics has almost the same meaning as morals. Ethics can also be the study of logically systematizing rules and principles to classify correct and wrong actions and methodology.

Among the subtopics of ethics, bioethics deals with issues concerning life and medicine. Bioethics can be classified into medical ethics and research ethics. When applying it to physical therapists, medical ethics is clinical ethics and professional ethics related to the clinical activities of physical therapists, and research ethics is ethics related to research activities by physical therapists (in other words, physical therapy research ethics). Textbooks, etc. state that the four basic principles of bioethics are autonomy, beneficence, nonmaleficence, and justice. Their meanings are as follows: Autonomy is to honor the patient's right to make their own decision on treatment. Beneficence is the duty to act in the best interests of the patient. Nonmaleficence is to do no harm to the patient (at least the benefit should be greater than the harm). Justice is fairness and rightness in providing medical care.

Hippocrates said that "patients shall not be given the right to make decisions on anything at any time." This contains an idea that is criticized as paternalism in the contemporary ethical view. As in this case, the ethical view changes depending on the country, ethnic group, and historical context. Ethics is a topic that many religions and philosophers have discussed since the period before Christ, e.g., what is good and what is bad, how to distinguish between good and bad, but it has not been settled yet to this day. With the advancement of scientific technology, the fact that humankind has acquired technologies that significantly affect life and social living, such as organ transplantation, life-sustaining treatment, and gene manipulation, has further complicated the bioethics discussion.

Half a century has passed since the birth of physical therapists in Japan in 1965. Many physical therapists have been nurtured, and the importance of the existence of physical therapists in medical care and society has been growing. Under such circumstances, physical therapists are required to be highly aware of clinical ethics and research ethics and to implement clinical and research activities

based on them. The first step may be to think about specific problems in daily living and clinical activities from the viewpoint of bioethics.

2) Medical ethics

Medical ethics and clinical ethics are almost synonymous; they were born as guidelines of behavior that physicians should have, and have spread to healthcare-related professionals such as nurses, physical therapists, and occupational therapists. The contents of activities and medical positioning in laws vary according to the profession, and there are particularities of medical ethics for each profession. Nonetheless the rules and principles of medical ethics are shared, and this section looks at changes in attitudes toward medical ethics based on the doctrines of Hippocrates, which are considered to be the origin of medical ethics.

(1) The Hippocratic Oath

Hippocrates (around B.C. 460 to 370) is also referred to as the "Father of Medicine." He developed medicine from that which had been superstition and magic to empirical science based on the accumulation of objective observation and clinical practice. Hippocrates wrote "the Hippocratic Oath" for individuals who pursued medicine to make a pledge to God (Table 1). The Hippocratic Oath contains the philosophy that forms the basis of modern medical ethics such as the purpose of medicine to give health benefits, the protection of privacy, physicians' devoted attitude, and fairness of medicine. It has been passed down for a long time in Western Europe as a spiritual pillar for training doctors.

(2) Patient rights

The contents of the Hippocratic Oath are the basis of medical ethics and physicians should respect them, but there is a paternalistic aspect of healthcare professionals compared to the modern viewpoint of patient-centered medicine.

The Nuremberg trials were held on inhumane Nazi human experimentation after the second world war. Based on these, the World Medical Association adopted the "Ethical Principles for Medical Research Involving Human Subjects (Declaration of Helsinki)" (1964). The Declaration of Helsinki strongly states "adequate information provision and voluntary consent of subjects based on it" for participation in research, and this leads to the principle of medicine of performing medical practice based on explanation and consent (informed consent) as the protection of the human rights of patients in medicine. Implementation of medical care based on explanation and consent is also a principle of medical ethics that should be complied to in physical therapy as well.

Table 1 Main Contents of the Hippocratic Oath

• I will reckon him who taught me this Art equally dear to me as my parents, to share my substance with him, and relieve his necessities if required
• I will look upon his offspring in the same footing as my own brothers, and to teach them this Art, if they shall wish to learn it, without fee or stipulation
• I will impart a knowledge of the Art to my own sons, and those of my teachers, and to disciples bound by a stipulation and oath according to the law of medicine, but to no others.
• I will consider for the benefit of my patients, and abstain from whatever is deleterious and mischievous.
• I will give no deadly medicine to anyone; and I will not give to a woman a pessary to produce abortion.
• I will not cut persons laboring under the stone but will leave this to be done by men who are practitioners of this work.
• With purity and with holiness I will pass my life and practice my Art.
• I will abstain from every voluntary act of mischief and corruption; and, further from the seduction of females or males, of freemen and slaves.
• Whatever, in connection with my professional practice or not in connection with it, I see or hear, in the life of men, which ought not to be spoken of abroad, I will not divulge, as reckoning that all such should be kept secret.

In addition to respecting patients/clients and research subjects and the necessity of obtaining informed consent for voluntary participation in research by subjects, the Declaration of Helsinki mentions the protection of privacy and personal information, approval of an ethical review committee when conducting research, and medical research being reasonable.

3) Professional ethics

(1) Code of ethics

Matters concerning medical ethics with which physical therapists should comply when carrying out clinical activities are the professional ethics for physical therapists. Regarding professional ethics for physical therapists, the "Rules of Ethics" of the Japanese Physical Therapy Association serve a role in the code of ethics (Table 2). Ethical codes are composed of five items of basic spirit and six items of matters to be observed. The basic spirit includes the basics of medical ethics such as equality, autonomy, and beneficence. The matters to be observed address a sense of responsibility as physical therapists, the implementation of physical therapy based on explanation and consent, cooperation with various professions, the protection of personal information, unprofitability, and improper rewards.

(2) Clinical ethics

This section discusses clinical ethics for physical therapists using the "Guidelines for Professional Ethics for Physical Therapists" by the Japanese Physical Therapy Association (Table 3). First, the Guidelines describe social ethics that the members shall not only improve their knowledge and skills but also endeavor to constantly ameliorate a sense of ethics (morality) in the members' clinical operations and daily living, and each member shall master and maintain suitable dignity. It should be kept in mind that while physical therapists are healthcare professionals, they should comply with not only clinical ethics but also social ethics.

Table 2 The Japanese Physical Therapy Association: Rules of Ethics

The Japanese Physical Therapy Association hereby establishes rules of ethics as standards for its members to be aware of the mission and duties of physical therapists, always to order their lives and discipline themselves.

Basic spirit

1. Physical therapists shall act toward each person in an equal manner regardless of nationality, race, ethnicity, religion, culture, thoughts, creeds, family origin, social status, age, or sex.
2. Physical therapists shall provide society with their knowledge, skills and experience to the extent possible for the people's health, medical care and welfare.
3. Physical therapists shall constantly devote themselves to their studies as a professional and make efforts in the development of physical therapy.
4. Physical therapists shall take responsibility and carry out operations in good faith and do their best.
5. Physical therapists shall make efforts in nurturing younger people.

Matters to be observed

1. Physical therapists shall give treatment and guidance based on the objectives of and responsibility for the operations in the areas of health, medical care and welfare.
2. Physical therapists shall adequately explain the contents of treatment and instruction.
3. Physical therapists shall collaborate with other related professions in good faith and take their responsibility, and maintain trust with all team members.
4. Physical therapists shall keep information learned through work secret.
5. Physical therapists shall not be involved in companies' profit objective.
6. Physical therapists shall not request or collect rewards except for their specified just rewards.

(established on May 17, 1978)
(partially revised on May 16, 1997)
(partially revised on April 1, 2012)

Table 3 Guidelines for Professional Ethics for Physical Therapists

Preamble

Forty years have passed since the physical therapist qualification was born in Japan. Today, people routinely use the word “rehabilitation” and accordingly, physical therapy, which is the act of physical therapists, has been understood by the general population. In recent years, the background, i.e., aged society, is serving as a favorable condition for physical therapists and expectations and demands on them from society are significantly growing. As if responding to this, many new physical therapists were born, and the number of Japanese Physical Therapy Association members has been acutely increasing along with acceleration in the reduction of their mean age. The activities of physical therapists are not only in the medical area but have expanded into many fields, such as the welfare area. Under these circumstances, there is a growing number of young physical therapists involved in operations in an environment where they can hardly receive advanced guidance at their affiliated hospitals or facilities. In contrast, with the development of society, informatization has rapidly advanced, and thus the people have very high levels of knowledge on medical care and welfare, i.e., diseases and disabilities. If the people have strong recognition of physical therapy through these phenomena, it can be easily imagined that naturally, each physical therapist will be highly criticized.

In addition, considering Japan’s social situation of today, declined social morality has been argued at the back side of prioritizing economic efficiency in various fields including the medical field. Accidents and incidents, which are likely to be attributable to inadequate or a lack of professional ethical perspective, have been brought to the surface; it has even been said that the destruction of professional ethics has begun. During such a trend in which the number of young physical therapists has drastically elevated at once and social demands on professional ethics have been growing, there is no doubt that we are in an era in which the character of physical therapists is being increasingly tested. Japanese Physical Therapy Association members shall not only improve their knowledge and skills but also endeavor to constantly ameliorate a sense of ethics (morality) in the members’ operations and daily living, and each member shall master and maintain suitable dignity.

Members need to discipline themselves and take responsibility for acting as physical therapists who are professionals engaged in medicine in not only their duties for medical care but also research and education for “improving personality and ethical and academic skills, making efforts in the spread and amelioration of physical therapy in Japan, and thereby contributing to the advancement of the people’s medical care, health and welfare” (Article 3 of the Articles of Incorporation of the Japanese Physical Therapy Association). Then, members shall act fairly toward patients and clients, make rational judgments while respecting their rights, and take responsibility for carrying out the acts of physical therapy with the ethical codes of the Japanese Physical Therapy Association as the basic spirit and the matters specified in these Guidelines for professional ethics as the mode to be observed. The members should be fully aware that medical practice is a legitimate invasive act, and physical therapists who get involved in medical practice shall not harm patients or clients and make efforts to be able to provide them with profit while actively preventing and helping to eliminate harm. Furthermore, members have a responsibility to perform operations while respecting human rights so that the patients and clients can make autonomous decisions and behave.

1. Confidentiality

1) Pursuant to “Article 16 of the Physical Therapists and Occupational Therapists Act” and “Article 134 of the Penal Code,” physical therapists shall not leak the secrets of patients and clients to a third party without a justifiable reason.
2) The term secret refers to the secrets of patients and clients learned through the course of medical care or consultation/guidance. Physical therapists shall recognize that matters, not limited to physical or mental disabilities and disease conditions, are secrets as long as they are undisclosed to others and of benefit to the patients or clients.
3) Physical therapists shall make efforts to prevent leakage of medical records, computer data, memos and conversations.

2. Personal Information Protection

1) Physical therapists shall prevent personal information and information of individuals from going public from the viewpoint of privacy protection together with confidentiality obligation in a highly sophisticated information society.
2) Physical therapists shall protect the personal information such as names, dates of birth, and addresses related to patients and clients so that they are not leaked.
3) Physical therapists shall protect information related to individuals, i.e., patients and clients, such as information on the disease condition, patient assessment, treatment program, therapeutic effects, and healing status of patients or clients so that they are not leaked.
4) Physical therapists shall protect the personal information such as names and dates of birth related to

institution staff so that they are not leaked.

5) Physical therapists shall protect information related to individuals such as the physical features and personalities of institution staff so that they are not leaked.

3. Duty to Attend

1) Physical therapists have an obligation to accept the requests of patients and clients when they visit for medical care or consultation/guidance to the extent that physical therapy is given under the direction of a physician in accordance with Article 19 of the Medical Practitioners Act.

2) Physical therapists may request patients and clients for collaboration in medical care or consultation/guidance.

4. Medical Care (Guidance) Contract

1) Medical care is also a contracted act and shall be a mutual participation type with the participation of patients and clients.

2) When medical care (guidance) for patients and clients is requested and physical therapists accept this, a contract on medical care (guidance) is established and deemed to be acknowledged.

3) Physical therapists shall execute medical care and consultation/guidance in accordance with the contract on medical care (guidance).

5. Informed Consent (Explanation and Consent)

1) Physical therapists have an obligation to explain a situation to patients, clients and their families when demanded by patients and clients or as necessary even if not demanded.

2) For explanation, physical therapists shall review policies for medical care and guidance, and the scope of explanation in cooperation with physicians and team members (staff) in a coordinated manner.

3) Physical therapists shall approach their duties by requesting patients and clients to collaborate in matters for which physicians entrusted the physical therapists to make a judgement, and obtain consent from the patients and clients.

4) Physical therapists have an obligation to give an explanation to the extent requested by patients and clients who have an ability to make a judgement but should accept that they have the “right of not being informed” as well.

6. Obligation to Accept Prescriptions

1) Physical therapists are medical care assistants, thus shall give medical care under the direction of physicians.

2) In medical practice, physical therapists shall give medical care to patients based on physicians’ prescription.

3) Prescription is deemed as being made by its issuance by a physician and its acceptance.

4) Changes in the contents of medical care shall be also made with a prescription.

5) In the health/welfare fields, physical therapists shall give consultation and guidance to patients/clients while keeping cooperation with team members (staff) including physicians and collaborating with them in a coordinated manner.

7. Obligation to Record and Retain Medical Charts

1) When medical care is given, physical therapists shall promptly record the date and contents of medical care in a medical chart or medical care assistance record.

2) Physical therapists shall enter the date and contents of medical care in a medical chart without falsification.

3) Physical therapists shall retain medical charts or medical care assistance records for five years.

8. Disclosure of Medical Care Information

1) When the disclosure of medical care information is requested, it shall be disclosed through the head of an institution or physician based on the judgement and instruction of the head of the institution and treating physician.

9. Morals and Manners to Be Observed

1) Physical therapists shall observe manners as members of society in accordance with public policy and comply with morals of healthcare professionals, thereby making efforts in refining their dignity.

2) Physical therapists shall refrain from acts defaming the credibility of physical therapists.

3) Physical therapists shall be wary of receiving money and goods such as rewards that may cause misunderstanding.

4) Physical therapists shall make sure to constantly check themselves to keep their own autonomy.

5) Physical therapists shall not obviously criticize or defame other physical therapists, etc.

6) Physical therapists shall not engage in merchandise sales for the purpose of their own profits.

7) Physical therapists shall not have personal interest with healthcare-related businesses.

8) Physical therapists shall not perform acts that may be subject to administrative punishment.

10. Procedures and Methods for Medical Care and Consultation/Guidance

1) Physical therapists shall use procedures and methods that are based on scientific evidence.

2) Under all circumstances, physical therapists shall receive consent from patients.
3) When asking about the physical and mental condition of patients/clients, physical therapists shall pay attention to wording.
4) When meeting patients/clients, physical therapists shall pay attention to not only language but also non-verbal expressions such as behavior and facial expression.
5) No harm or pain shall be given to patients, and when medical care causes pain, physical therapists shall adequately explain it to patients and receive their consent.
6) Physical therapists shall not cause patients/clients to have mental distress.
7) Medical care and guidance are intended to assess and treat patients/clients; physical therapists shall use medically approved procedures and methods.

11. Safety Assurance
1) Physical therapists shall always be vigilant in caution for the prevention of medical accidents.
2) Physical therapists shall immediately report medical accidents if they occur to the primary physician and institution manager.

12. Prevention of Sexual Harassment
1) Physical therapists shall not sexually harass the other party, that is any sexual behavior that makes the other party feel uncomfortable, whether or not the persons who behaved such intended to do so.
2) Physical therapists shall not act in such a manner that can be mistakenly deemed as sexual harassment.

13. Prevention of Bullying in Academia
1) Physical therapists shall not harass staff or students of any relationship at educational institutions such as schools, research, learning settings, extracurricular activities, and work by abusing power, whether or not harassment is intended.
2) Physical therapists shall not act in such a manner that can be mistakenly deemed as bullying in academia

14. Routine Refinement
1) Physical therapists shall continue mastering and improving knowledge, skills, and attitude throughout their lives to have highly specialized knowledge, skills, and ethics suitable for a professional.
2) Physical therapists shall endeavor to constantly refine themselves to be able to select the best medical care method for patients.
3) Physical therapists shall continue to be studious and interested in training.
4) It is preferable to become specialized physical therapists in accordance with the lifelong learning system of the Japanese Physical Therapy Association.

15. Research Morality
1) When conducting research, physical therapists shall comply with the “Declaration of Helsinki” and “Ethical Guidelines for Clinical Studies,” a notification of the Ministry of Health, Labour and Welfare.
2) When there are human subjects, physical therapists shall obtain the human subjects’ acceptance and state that fact in a paper.
3) Physical therapists shall protect the human rights and rights of human subjects and be considerate so that the human subjects will not suffer any disadvantages.
4) When presenting research, physical therapists shall respect morals and be considerate of protecting the human subjects’ privacy, anonymity and confidentiality.

16. Good Teamwork
1) Physical therapists shall be mutually cooperative with other physical therapists and with all professionals involved in medical care and consultation/guidance.
2) In a team, individual members shall respect each other and collaborate with each other.
3) Physical therapists shall promptly share learned information with their team and attempt to continue treatment.

17. Nurturing of Younger People
1) Educating students who intend to become physical therapists and new physical therapists is an obligation of experienced physical therapists.
2) Experienced physical therapists shall be an example to students who intend to become physical therapists and new physical therapists.

March 1, 2006
(Revised on April 15, 2012) Ethics Committee, the Japanese Physical Therapy Association

In addition, the Guidelines specifically describe matters to be observed with respect to: [1] Confidentiality, [2] Personal Information Protection, [3] Duty to Attend, [4] Medical Care (Guidance) Contract, [5] Informed Consent (Explanation and Consent), [6] Obligation to Accept Prescriptions, [7]

Obligation to Record and Retain Medical Charts, [8] Disclosure of Medical Care Information, [9] Morals and Manners to Be Observed, [10] Procedures and Methods for Medical Care and Consultation/Guidance, [11] Safety Assurance, [12] Prevention of Sexual Harassment, [13] Prevention of Bullying in Academia, [14] Routine Refinement, [15] Research Morality, [16] Good Teamwork, and [17] Nurturing of Younger People. There are many matters to be observed, but this can be proof that the work of physical therapists is important and requires responsibility.

(3) Physical therapy research ethics

Research has the processes of drawing up a research plan, collecting data according to the plan, organizing and analyzing collected data, discussing and drawing conclusions based on analysis results, and making reports/publications (Figure 1). In addition, through these processes, research has the purpose of understanding the characteristics and laws of nature, humans, and society and enriching human life by applying them. Researchers have the responsibility to properly carry out these processes and present objective and logical conclusions. Responsible research acts require "honesty" to honestly perform research as planned, "accuracy" to accurately inform obtained results without falsification, "effectiveness" to effectively use resources for research without waste, and "objectivity" to express facts as is and eliminate bias.

However, if the processes of drawing up a research plan, collecting data according to the plan, organizing and analyzing collected data, discussing and drawing conclusions based on analysis results, and making reports/publications are not properly implemented, and misconduct such as data fabrication, falsification of results, or plagiarism of data from other research occurs, the credibility of the research is lost, and can even lead to social loss. Physical therapy in research is also required to have "honesty," "accuracy," "effectiveness," and "objectivity."

For medical research involving human subjects, the "Ethical Guidelines for Medical and Health Research Involving Human Subjects (Ministry of Education, Culture, Sports, Science and Technology/Ministry of Health, Labour and Welfare)" were established in 2015 and used as the foundation of ethical review on research involving human subjects including physical therapy. When conducting research involving human subjects, a research plan must be drawn up in accordance with these Guidelines. In research performed by physical therapists, the principles are to explain the benefits and risks associated with the research to the human subjects in an easily understandable manner and then obtain voluntary consent from the human subjects for participation in the research.

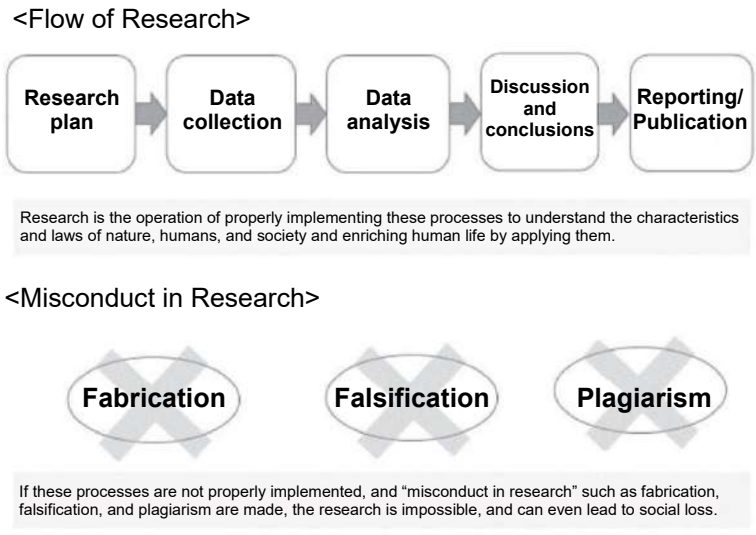

Figure 1 Flow of Research and Misconduct in Research

A statement on research ethics is strongly required when submitting a paper to scientific journals or presenting it at academic conferences. For the " Journal of the Japanese Physical Therapy Association" the scientific journal of the Japanese Physical Therapy Association, its submission rules have specified since 2017 that "prior to the research, it is essential to obtain approval of the ethics committee at the affiliated research organization or affiliated institution or an organization equivalent to such, and the name of the ethics committee and the acknowledgment number (or date of acknowledgment) must be provided;" thus, approval of an ethics committee has become an essential requirement for conducting research. Ethics review is performed by an ethical review committee established in the organization with which physical therapists affiliate, and the ethical review committee has also been formed in the Japanese Physical Therapy Association since 2017.

(Hisashi Mochizuki)

2. Physical Therapy Management (Safety Management/Risk Management Measures)

1) Medical safety

Medical safety is referred to as "Patient Safety" in English. "Healthcare should be safe" but is not necessarily so. Despite making an effort to safely perform medical practice as much as possible, medical accidents occur. Until the 1990s, it was considered that "medical accidents are supposedly impermissible things and can be prevented if individuals pay attention." In Japan, an accident of mixing up patients occurred at Yokohama City University Hospital and an accident of mistakenly injecting a disinfectant occurred at Tokyo Metropolitan Hiroo Hospital in 1999: This year was referred to as the first year of medical safety in Japan, and consciousness about medical safety was elevated. In the same year in the US, the Committee on Quality of Healthcare in America stated that "every human being makes mistakes," and the attitude was changed to prevention by system. Currently in Japan, instead of "paying attention" to human error such as "careless mistakes" and "omission," which may happen, the mainstream notion is "systematic measures (to work on accident prevention by organizations and to avoid accidents through this scheme)" without depending on individual efforts and credentials. Proper knowledge on medical and nursing care accidents is required to correctly grasp these systematic measures. These accidents can be classified into "force majeure" and "negligence." Force majeure is any event for which no responsibility arises even if it could not be avoided despite exercising caution and prevention. Negligence is an event that could have been avoided by paying attention and for which legal responsibility may be held.

(1) Liabilities

Responsibilities are referred to as "three liabilities": Civil, criminal, and administrative punishment.

Civil liability: For a "complaint," etc., compensation for loss or damage is reviewed in settlement. The contents are to question "whether the duty to care was violated" on the premise of the possibility of avoidance as to "whether negligence was foreseeable." For violation of the duty to care, the causal relationship with "the medical standards in clinical medical practice at the time of giving medical care" is focused on. In addition, it is specified that "various factors, such as the characteristics of the medical institution and the features of the regional healthcare environment where it is located, should be taken into consideration." The details are examined, and whether the accident was due to force majeure or violation of the duty to care is reviewed from the viewpoint of medical standards at the time that the medical care that caused the accident was given. In the past, there was a case of claiming compensation for loss or damage because the contents of physical therapy were inappropriate. Hence, it has been found to be essential to constantly study physical therapy that meets the medical standards of an era. According to the Civil Code, violation of the duty to care is classified as follows:

[1] Liability due to non-performance (Article 415 of the Civil Code)

Duty of due care of a prudent manager based on a medical care contract → Main provider/establisher

[2] Tort liability

(a) Tort liability (Article 709 of the Civil Code)

Negligence (violation of the duty to care) by the person who performed the medical practice → Individual (clinical laboratory technician)

(b) Liability of employers (Article 715 of the Civil Code)

Violation of supervisor's duty to care → Hospital, hospital president, laboratory director, etc.

(c) Liability of joint tortfeasors (Article 719 of the Civil Code)

Violation of the duty to care in team medical care → All persons involved with intentional negligence

Criminal liabilities (causing death or injury due to negligence in the pursuit of social activities): Death occurred, or a serious disability remained, the police was informed of such by a patient, family, or medical institution and investigates, and prosecutors decide whether to file criminal charges or drop the charges. A person who fails to exercise the due care required in the pursuit of social activities and thereby causes the death or injury of another person is punished by imprisonment or imprisonment without work for not more than five years or a fine of not more than 1,000,000 yen. (Article 211, Paragraph 1 of the Penal Code).

Administrative punishment: It often takes place when an individual is found guilty as a result of criminal proceedings, and individual responsibility is taken. The punishments include the revocation of license, suspension of business, and reprimand. Serious warning is not an administrative punishment but is "administrative guidance."

It is necessary to understand that there are cases where liabilities are imposed to individuals as described above. Recently, in addition to physical therapy practice at the hospital, etc., physical therapists may operate business in an area without a physician's instruction, such as preventive health care business for the elderly entrusted by municipalities. When engaging in such activities, physical therapists may encounter unexpected risks (being accused of an accident, harassment, etc.) so it is recommended to purchase non-life insurance (liability insurance). In order for physical therapists to continue their activities, it is important to be conscious about protecting themselves by taking out non-life insurance for unexpected risks.

(2) Legal grounds of medical safety

Article 6-10 of the Medical Care Act stipulates that "the administrator of a hospital, clinic, or birthing center, pursuant to the provisions of an Order of the Ministry of Health, Labour and Welfare, shall take measures to ensure the safety of medical care in the relevant hospital, clinic, or birthing center such as formulating guidelines to ensure the safety of medical care and providing training for employees." As for specific measures, obligations to publish medical safety guidelines and a medical safety manual, form a medical safety committee, hold medical safety training for all employees, issue medical safety news, and take measures to prevent medical accidents are specified.

We, physical therapists, are no exception. We must be sure to go through and understand the medical safety guidelines, manuals, etc. at each institution. It is outrageous to make excuses such as "I don't know where the manual is" and "I don't know the procedures for taking action in the event of a fall because I haven't learned them from my senior colleagues."

In recent years, the active medical safety measures by physical therapists have been authorized at their institutions, and the number of physical therapists playing the role of "medical safety manager" to manage medical safety at the entire institution has been increasing.

(3) Actions in the event of an accident

As previously mentioned, physical therapists should verify the medical safety manual at their institutions. It is important to take actions as specified in the manual. The physical therapists should not consider that "no action or reporting is necessary for this degree of event" by their own judgment but should consult their superior or senior colleague when in doubt.

As an example of a general action, this section describes the action to be taken in the case that a patient falls. First, a physical therapist should verify the state of consciousness and pain at the time of the fall, and at the same time, ask for assistance by surrounding staff, transfer the patient to a safe bed, etc., and examine his/her vital signs and injured sites. At that time, in order to grasp the course, it is important to request collaboration with surrounding staff so that the patient can remain there. The patient's condition may suddenly change while leaving the area for even a few minutes. If that happens, the physical therapist cannot grasp the course and may not be able to take appropriate action. The physical therapist should contact the primary physician and, as necessary, the emergency outpatient unit and follow their subsequent instructions. In addition, it is an important task of the responder to prepare an incident report as soon as possible after the onset of an event, analyze the cause, discuss recurrence preventive measures with his/her superior, and inform other staff of the event.

Table 4 General Incident Levels

Level	Severity of injury	Details of injury
Level 1	No actual harm to the patient	
Level 2	No action taken or treatment given	Temporal reinforcement of observation, tests, etc.
Level 3a	Requiring a simple action and/or treatment	Administration of an analgesic, saturation, etc.
Level 3b	Requiring an intense action and/or treatment	Surgery, prolongation of hospitalization, etc.
Level 4a	Permanent disability or sequela	No significant impairment or cosmetic problem
Level 4b	Permanent disability or sequela	Significant impairment or cosmetic problem
Level 5	Death	Except for the natural course of primary disease

2) Prevention of medical accidents

A medical accident is referred to as an "Adverse Event" in English. It is considered to be an event contrary to "that expected" and translated into Japanese as a harmful event. This section introduces three representative measures to prevent medical accidents.

(1) Incident report

When an incident (such as wrong medical practice that was identified before being implemented in a patient or wrong medical practice was performed but did not result in an adverse effect on the patient) or accident (wrong medical practice was carried out and resulted in an adverse effect on a patient) occurs, a physical therapist should submit an incident report to prevent medical accidents. Submission is required even for near-miss events. This is not intended to pursue responsibility of individuals but to investigate the cause to lead to recurrence prevention.

(2) Heinrich's Law

Heinrich's Law is an empirical law of industrial injury suggested by William Heinrich, who was working for a general insurance company in the US, based on data accumulated when investigating at least 5,000 cases of industrial injuries. It states that for every accident that causes a major injury, there are 29 accidents that cause minor injuries and 300 accidents that cause no injuries. Based on this result, it is also referred to as the "1:29:300 rule" or "near-miss law." For example, this law assumes that if one case of bone fracture caused by fall occurred, there may be 29 cases of fall behind this bone

fracture and 300 cases of stumbles, etc. behind them. For preventing a major accident, it is important to avoid minor mistakes. It has been considered that measures should be taken based on information on near misses. Consequently, a larger number of incidence reports is found to be better than a smaller number. An annual number of cases five times higher than the number of beds is appropriate.

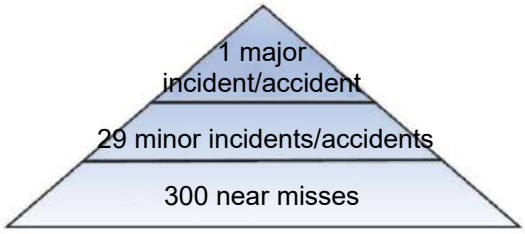

Figure 2 Heinrich's Law

(3) Swiss cheese model

The Swiss cheese model is a concept of safety management proposed by James Reason, a British psychologist. The slices of cheese with holes in Figure 3 are regarded as barriers. This model illustrates that one slice of cheese has many holes so an arrow can easily penetrate it, but if the slices of cheese (barriers) are aligned with holes in different places, the arrow stops at the next slice (barrier) as shown in [1]. By aligning several slices, the possibility that the arrow can go through them is reduced as in [2]. However, if the arrow incidentally penetrates them as in [3], this allows an accident to occur.

In other words, this model suggests that multi-layered measures can reduce the possibility of accidents occurring. It may be time-consuming, but establishing multi-layered measures such as multiple verifications leads to the prevention of accidents.

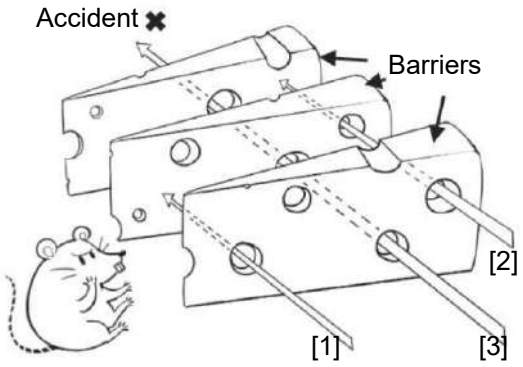

Figure 3 Swiss Cheese Model

3) Infection prevention measures

The principles of infection prevention measures are: "Do not bring in pathogens;" "do not take out pathogens;" and "do not spread pathogens." Today, physical therapists' awareness about infection prevention has elevated due to the "COVID-19" pandemic, so many physical therapists are practicing standard precautions. An infection prevention manual has been established for each institution. Furthermore, many official websites such as the website of the Ministry of Health, Labour and Welfare provide information on handwashing, cough etiquette, and personal protective equipment (PPE) including masks and gloves.

Hand hygiene: Hand hygiene is the most basic and important measure. Prevention of pathogens brought in via fingers is essential. Blood and body fluid can be washed with soap and running water,

and alcohol is suitable for eradicating pathogens. There is a device called Hand Wash Checker to verify whether hand hygiene is properly implemented. There are many institutions where hand hygiene is periodically checked, showing its importance.

PPE (Personal Protective Equipment): It includes masks, gloves, gowns, face shields, goggles, caps, shoe covers, etc.

Mask: It has become commonplace to wear masks due to "COVID-19" and flu prophylaxis. If the nose is not covered by a mask, the effect of wearing a mask is reduced; cases of improper wearing of masks causing outbreak (collective occurrence of infection) are frequently seen in the news. Considerations are also necessary, such as avoiding conversation while eating, during which masks are removed. When having directly contact with patients with tuberculosis or individuals who are positive for "COVID-19," N95 masks, which have good filter function and a better effect of preventing infection than surgical masks, should be used.

Gloves: When touching blood, body fluid, or excrement or having contact with contaminated or infected patients, physical therapists must wear gloves. They can prevent the possibility of transferring bacteria to the hands when touching the patients and then spreading germs by touching other things or people. It is important to be sure to change gloves after touching contaminants or infected materials. Basically, physical therapists directly touch patients during intervention. Physical therapists should accustom themselves to wearing gloves in settings such as treatment and care and master techniques to properly remove them.

Goggles/Eye guards: Transmission to eyes is likely to occur during aspiration or contact with patients with frequent coughing or highly contagious patients. There may be people who think that this mainly concerns physicians and nurses and is not related to physical therapists, but physical therapists have many opportunities to get involved in sputum aspiration and persons with infection and cough. Physical therapists should keep in mind that cases resulting in death have been reported and take action.

4) Personal information protection

Article 16 of the Physical Therapists and Occupational Therapists Act stipulates that "physical therapists or occupational therapists shall not leak the secrets of individuals learned through their work to others, except for cases where there are justifiable reasons. The same provision shall apply after said person ceases to be a physical therapist or occupational therapist," and Article 21 strictly specifies that "any person who has violated the provisions of Article 16 shall be punished and liable to a fine not exceeding five hundred thousand yen." The Japanese Physical Therapy Association also presents the "Guidelines for Professional Ethics for Physical Therapists" on its information disclosure site to call for attention.

Personal information protection is officially referred to as the "Act on the Protection of Personal Information." With the rapid advancement of communication technologies, this Act was established to prevent leakage of information enabling identification of specific individuals such as the name, sex, date of birth, individual physical information, assets, occupation, and title. This includes visual information and sound information as well. For physical therapy, information on disease conditions, assessments, treatment programs, treatment effects, course, etc. has to be notified to parties outside the hospital due to transfer to another hospital and cooperation with nursing-care services. It is important that physical therapists are conscious about preventing leakage of personal information.

In recent years, we occasionally come across cases where social media users post information and photographs identifying individuals without realizing that they are providing their personal information when presenting their experience. Information that may be read by an unspecified number of people should be posted with the greatest care.

In addition, information on patients or clients may be used for research, etc. Even when it is digitalized and then collected, informed consent should also be carried out to obtain consent. Its retention should be strictly controlled. It is preferable to retain information in paper form in a lockable place, and information in a computer in an independent environment in which no network is established. Personal information is often leaked due to a loss of computers and USB, so they should be carried with due care.

5) Harassment measures

(1) What is harassment?

Harassment is behavior that makes someone feel uncomfortable. It is annoying someone and signifies "abuse of human rights" in a broad sense. Sexual harassment, workplace harassment, pregnancy discrimination, and bullying in academia (schools, research, learning settings, extracurricular activities, and work) are common. What is important is not whether a person harassing someone (party at fault) has such an intention, but whether the party at fault made the other party (harassed person) feel unpleasant. For this reason, the party at fault often makes the excuse later that "I didn't mean to do that." Physical therapists should always pay attention that their words and actions will not be misleading.

(2) Legal rules for harassment

There is no precise definition of workplace harassment, but it is specified in the Act on Comprehensively Advancing Labor Measures, and Stabilizing the Employment of Workers, and Enriching Workers' Vocational Lives promulgated on June 5, 2019. In addition, sexual harassment is stipulated in the Act on Equal Opportunity and Treatment between Men and Women in Employment. Pregnancy discrimination is set forth in the "Child Care and Family Care Leave Act."

(3) Workplace harassment

Workplace harassment is behavior that causes mental or physical pain or deteriorates the work environment of a person working in the same workplace beyond the appropriate scope of work (when a boss shows authority according to his/her job position and professional ability and supervises operations and gives training/instructions) on the background of various superiorities such as occupational position, relationship, specialized knowledge, and experience.

The Act on Comprehensively Advancing Labor Measures, and Stabilizing the Employment of Workers, and Enriching Workers' Vocational Lives (Article 30-2: Measures in Terms of Employment Management) specifies that in order for an employer to preclude any behavior that is based on behavior that constitutes bullying in the workplace exceeding the scope necessary and reasonable in the course of business from damaging the work environment of the employer's workers, the employer shall provide consultation to those workers and take measures necessary in terms of employment management, such as developing a necessary system for appropriately handling such behavior. Hence, this Act is also referred to as the "workplace harassment prevention law."

(4) Sexual harassment

Article 11 of the Act on Equal Opportunity and Treatment between Men and Women in Employment stipulates that "employers shall take necessary measures for employment management, such as developing a necessary system for providing consultation to workers and appropriately handling the matters, so that the workers they employ do not suffer any disadvantageous working conditions on the grounds of that worker's response to sexual harassment in the workplace, nor suffer any damage to the work environment due to sexual harassment." Article 11-2 specifies that "workers shall endeavor to deepen their interest and understanding of sexual harassment problems and pay necessary attention to their behavior toward other workers, as well as cooperate with the measures referred to in Paragraph 1 of the preceding article taken by their employers." Thus, the provisions are stipulated for both employers and workers.

(5) Pregnancy discrimination

Article 25-2 of the Child Care and Family Care Leave Act specifies that "employers shall endeavor to deepen their interest and understanding of issues with childcare leave-related conduct and pay necessary attention to their conduct towards workers" and that "workers shall endeavor to deepen their interest and understanding of issues with childcare leave-related conduct, pay necessary attention to other workers, and cooperate with the measures to be taken by their employers referred to in Paragraph 1 of the preceding article." Thus, the provisions are stipulated for both employers and workers as with those for sexual harassment.

(Tetsuya Chiba)

3. International Statistical Classification of Diseases and Related Health Problems (ICD), International Classification of Impairments, Disabilities and Handicaps (ICIDH), and International Classification of Functioning, Disability and Health (ICF)

1) International Statistical Classification of Diseases and Related Health Problems (ICD)

The formal name of the International Classification of Diseases (ICD) is the "International Statistical Classification of Diseases and Related Health Problems." It is a classification of the causes of death and diseases specified according to globally unified standards developed by the World Health Organization (WHO). In Japan, the ICD has been adopted in official statistics (vital statistics, etc.) as "Statistical Classification of Diseases, Injuries and Causes of Death" which is statistical standards based on the Statistics Act. The ICD has been commonly used as a medical classification for managing medical charts at medical institutions. It has a long history: The first time that the ICD was introduced in Japan was 1900 and it was established as "International Statistical Classification of Diseases, Injuries and Causes of Death." Then, it was revised about every decade by the WHO. Currently, the ICD-10 (according to the 2013 version: Revision to the ICD-10 was made in 1990, but it was revised according to the 2003 version and according to the 2013 version.) announced in 2013 is used in Japan.

In other words, it is a statistical classification of diseases, injuries and causes of death and has been used for vital statistics in Japan: The publication of statistics of causes of death, patient survey conducted every 3 years, and Statistics of Medical Care Activities in Public Health Insurance implemented every year, etc.

The classification of the ICD-10 (2013 version) contains the following 22 categories:

1. A00-B99 Certain infectious and parasitic diseases
2. C00-D48 Neoplasms
3. D50-D89 Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism
4. E00-E90 Endocrine, nutritional and metabolic diseases
5. F00-F99 Mental and behavioural disorders
6. G00-G99 Diseases of the nervous system
7. H00-H59 Diseases of the eye and adnexa
8. H60-H95 Diseases of the ear and mastoid process
9. I00-I99 Diseases of the circulatory system
10. J00-J99 Diseases of the respiratory system
11. K00-K93 Diseases of the digestive system
12. L00-L99 Diseases of the skin and subcutaneous tissue
13. M00-M99 Diseases of the musculoskeletal system and connective tissue
14. N00-N99 Diseases of the genitourinary system

15. O00-O99 Pregnancy, childbirth and the puerperium
16. P00-P96 Certain conditions originating in the perinatal period
17. Q00-Q99 Congenital malformations, deformations and chromosomal abnormalities
18. R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified
19. S00-T98 Injury, poisoning and certain other consequences of external causes
20. V01-Y98 External causes of morbidity and mortality
21. Z00-Z99 Factors influencing health status and contact with health services
22. U00-U99 Codes for special purposes

For this ICD, the ICD-11, which was revised 30 years after the ICD-10, has been announced at 12:00 (Geneva time) on June 18, 2018, by the WHO and approved by the member countries at the WHO Assembly on May 28, 2019. In Japan, the ICD-11 is currently being reviewed by the ICD Subcommittee/ICD Expert Committee, Ministry of Health, Labour and Welfare and is in a stage where operations to introduce it in the future have been undertaken.

This ICD-11, of which revision is currently being prepared, consists of 26 items, compared with 22 items in the ICD-10, and the following items were independently added: "Diseases of the immune system," "Sleep-wake disorders," "Conditions related to sexual health," and "Traditional Medicine Conditions - Module I." Particularly, "Gender identity disorders," which were included in 5.F00-F99 Mental and behavioural disorders in the ICD-10, were changed to "gender incongruence" under the "Conditions related to sexual health." In addition, "Gaming disorder" was added to the section concerning disorders due to addictive behaviours; therefore, the ICD-11 enables classification taking account of functioning.

2) From the International Classification of Impairments, Disabilities and Handicaps (ICIDH) to the International Classification of Functioning, Disability and Health (ICF)

The International Classification of Impairments, Disabilities and Handicaps (ICIDH) was also announced in 1980 by the WHO as a supplementary classification of the ICD. At that time, three words, namely "impairment," "disability," and "handicap" were used because there is no single word comprehensibly expressing these states in English. Thereafter, it became clear that their definitions imply only the negative aspects of these words and have limitations. In other words, the ICIDH had a strong context of a disease-centered medical model: A disease, which is the cause, affects individuals' pathological changes, manifesting as symptoms (dysfunction). This caused the users of the ICIDH to interpret that a disease would result in social disadvantages, which is a straight-line relationship (Figure 4).

However, due to historical backgrounds such as a social model regarding declined abilities and handicaps being environmental issues in some cases, the spread of normalized thinking, and the surge of independent living (IL) campaign, the WHO revised the ICIDH. As a result, two drafts, namely the ICIDH-2 Beta 1 Draft in 1997 and ICIDH-2 Beta 2 Draft in 1999, were announced as field trials. In 2001, the International Classification of Functioning, Disability and Health (ICF) was adopted at the WHO Assembly as a revised version of the ICIDH. The Japanese version of the ICF was completed in July 2002.

The major characteristic of this International Classification of Functioning, Disability and Health (ICF) is that the perspective of "environmental factors" was added to its components: For the functioning and disabilities of individuals, there are "body function and structures" and "abilities and participation," and the background factors affecting these are "environmental factors" and "personal factors." Consequently, these were added to the ICF. This has facilitated the concept that even if the

level of impairment is the same, if environments are arranged with accessibility and universal design, the levels of “abilities” and “participation” improve.

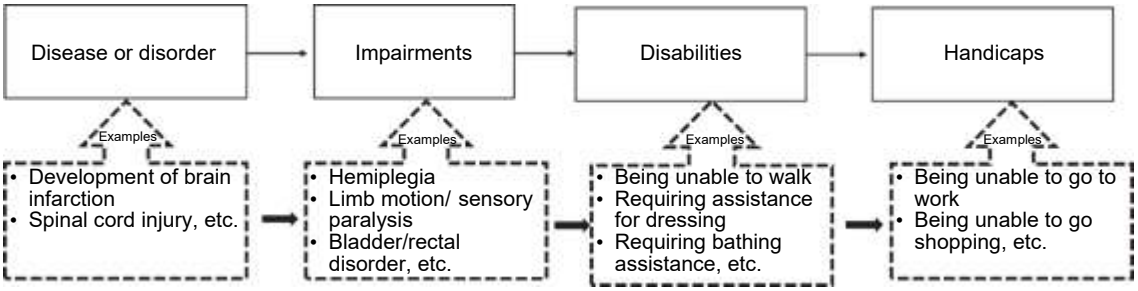

Figure 4 International Classification of Impairments, Disabilities and Handicaps (ICIDH)

ICIDH (International Classification of Impairments, Disabilities and Handicaps)
As shown in the examples in the lower boxes, with the ICIDH, the three dimensions are likely to be interpreted in a one-way manner: Impairments caused by diseases lead to disabilities and handicaps.

The emergence of the ICF has enabled direct assessment of the restriction of abilities and participation in living regardless of the cause. For example, when there is the same level of impairment that limits moving, if roads without steps and elevators in stations and facilities are arranged, the levels of “abilities” and “participation” can be more greatly improved compared with those in an environment without this arrangement. In other words, the ICF intends to classify by combining elements from the condition of functioning related to any health condition of an individual to the social systems and resources surrounding the individual, and express/describe them. Based on the concept that a disability is an interaction, and the complex relationship between health conditions and their background factors of environment and individuals, “environmental factors” and “personal factors” were added as background factors. In addition, from the viewpoint that they interact with each other, all elements are expressed with dual-directional arrows (Figure 5).

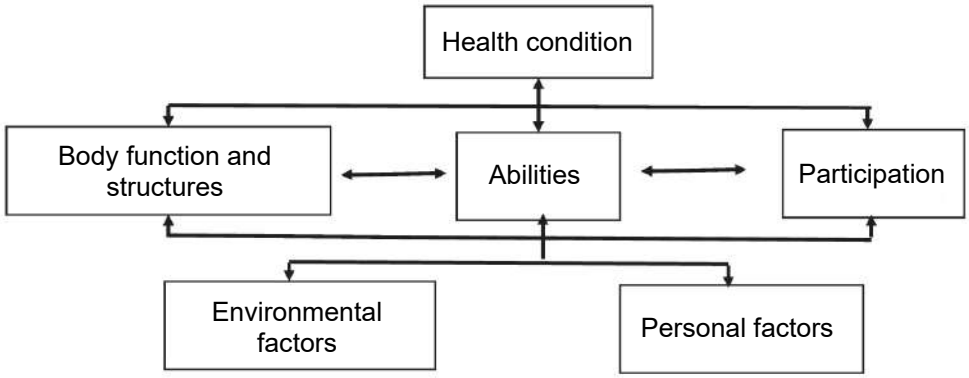

Figure 5 International Classification of Functioning, Disability and Health (ICF)

ICF (International Classification of Functioning, Disability and Health)
*It was established in 2001 as a revised version of the International Classification of Impairments, Disabilities and Handicaps (ICIDH).
In response to a criticism that the ICIDH takes only the negative aspect of disabilities into consideration, “environmental factors” were added from the standpoint of covering both positive and negative sides of living as a whole. The terms were changed to “health condition,” “body function and structures,” and “abilities and participation.” As a result, all elements are expressed in a dual-directional manner.

The background of the ICIDH and ICD is a medical model based on “etiology.” Compared with them, it would be difficult to understand the ICF unless the viewpoint of “living model” is present. The

reason for the opinion that "the ICIDH is easier to understand than the ICF" even today may be that the ICIDH is more suitable to the "mind-set" of the medical model than the ICF. In the concept of the ICF, the relationship between "body function and structures" and "abilities" appears to include the mind-set of this medical model.

As previously mentioned, the ICF is a classification supplementing the ICD, and the relationship is as illustrated in Figure 6. In a category of the WHO international classifications, they have a complementary relationship to divide their roles. The ICD is a classification of health conditions, i.e., the causes of death and diseases. The ICF is a classification of functioning and disabilities related to the health condition. Handling the two in a mutually complementary manner enables various classifications, even country-by-country comparisons.

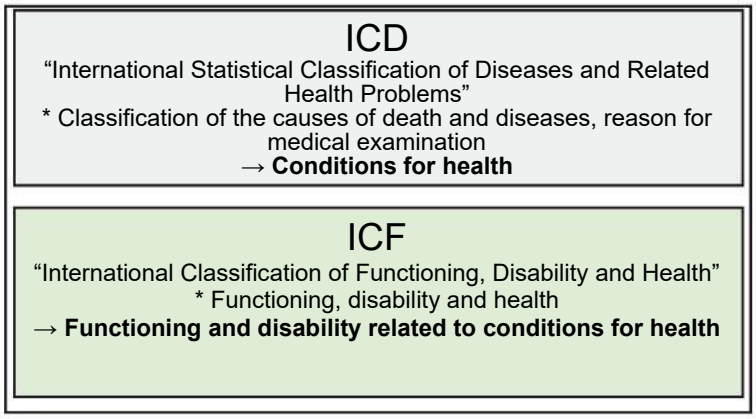

Figure 6 ICF among the International Classifications by the WHO
- Health and functioning classification for supplementing the disease classification -

3) Relationship with the Physical Therapists and Occupational Therapists Act

Our (physical therapists') office organization is stipulated in the "Physical Therapists and Occupational Therapists Act" (Law 137) established in 1965.

In it, the definition of "physical therapy" is specified in Chapter 1, Article 2, Paragraph 1 as follows:

"Under this Act, 'physical therapy' is defined as having people with physical disabilities engage in therapeutic exercise or other exercise, and adding electrical stimulation, massages, heat, and other electrophysical modalities, mainly in order to restore abilities of the basic activities," Similarly, "physical therapists" are stipulated in Article 2, Paragraph 3 as follows: "The term 'physical therapist' in this Act refers to a person that is in the business of performing physical therapy under the instruction of physicians with a license granted by the Minister of Health, Labour and Welfare and with the name of a physical therapist."

In other words, physical therapy "attempts to restore abilities of the basic activities" in "people with physical disabilities." A physical therapist is "a person that is in the business of performing physical therapy" "under the instruction of physicians" "with the name of a physical therapist." Thus, it is so-called legal protection of the title.

In addition, Article 15, Paragraph 1 of this Act sets forth that "notwithstanding the provisions of Article 31, Paragraph 1 and Article 32 of the Act on Public Health Nurses, Midwives and Nurses (Act No. 203 of 1948), a physical therapist or occupational therapist may engage in the business of physical therapy or occupational therapy as assistance for medical care." This emphasizes that as long as it is an instruction of a physician, the act of performing part of nursing work, which is the business monopolized by nurses, is legal. Similarly, Article 15, Paragraph 1-2 stipulates that "the provision of Article 1 of the Act on Practitioners of Massage, Finger Pressure, Acupuncture and Moxacauterization,

etc. (Act No. 217 of 1947) shall not apply to massage carried out as physical therapy by physical therapists at hospitals or clinics or upon specific instruction of physicians." It is ensured that it is legal to perform the work of various professions under instruction of physicians.

Consequently, there is a delicate relationship between the "Physical Therapists and Occupational Therapists Act" (Act No. 137) and the ICF or ICD. Originally, it can be said that the primary work is "attempting to restore abilities of the basic activities" by performing physical therapy as treatment under the instruction of physicians: The core of the work is to acquire the "abilities" particularly by approaching the "body function and structures" in the ICF. However, the ability of basic activities is closely involved in "abilities and participation," and for environmental factors, which are background factors for "abilities and participation," verification of the accommodation and adaptation of various welfare equipment, wheelchairs, assistive devices, etc. and training for their use are essential. In other words, intervention in daily living activities, in which physicians, nurses, and public health nurses are also involved, with physical therapy is necessary, and for this reason, clauses to specify not violating the laws such as the Act on Public Health Nurses, Midwives and Nurses are included.

The healthy life expectancy extension and preventive health care business for the elderly in the low-birth and super-aging society that Japan is facing have been dealt with by municipal comprehensive projects, etc. separately from medical intervention; thus, the approach is not necessarily only for people with "physical disabilities." Consequently, the Ministry of Health, Labour and Welfare issued a Notification from the Director of the Medical Professions Division, Health Policy Bureau dated November 27, 2013 (HPB-MPD Notification No. 1127-3). This notification specifies the use of the term "physical therapists" as follow: "Physical therapists sometimes carry out duties that are not considered assistance with medical treatment, such as giving guidance on fall prevention, for people without physical disabilities in a business promoting preventive health care for the elderly, and it is perfectly acceptable to use the term 'physical therapist' even when they perform duties other than physical therapy as stated above. Physical therapists carrying out duties that are not considered assistance with medical treatment need no instructions from a doctor."

It means that it is acceptable to use the term, "physical therapists" when giving advice on various matters from the viewpoint of physical therapy to the elderly, etc., showing that the scope of activities as physical therapists has been expanding.

(Kengo Takashima)

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AFTERWORD

In every era, terms vividly expressing each of their backgrounds are created. The modern society in which we are living is suggested to be in a phase of major change by keywords such as the Convention on the Rights of Persons with Disabilities, super-aging society, declining birthrate and aging population, changes in disease structure, lifestyle diseases, community-based integrated care system, healthy life expectancy, and integrated provision of healthcare and nursing care. In such an era, I am glad that the Japanese Physical Therapy Association (JPTA) publishes a book titled "Principles of Physical Therapy" to consolidate the history and prospects of physical therapy (therapists/science), and at the same time, I express my gratitude to each of the authors.

Our work has been established as a result of day-to-day accumulation of activities by our predecessors and through social contribution by playing a specific role as professionals and getting involved in the habilitation and rehabilitation areas for a long time. Half a century has already passed since the physical therapists began activities during the pioneer days in Japan and acquired national qualifications. In recent years, more than 120000 physical therapists are involved in various duties in not only the medical area but also the healthcare, medical, and welfare areas.

The Committee for Developing an Introduction to Physical Therapy was established as a critical topic of the JPTA. Then, after 12 meetings (August 2018 to December 2020) from the inauguration of the Committee, this book was published. I would like to describe again the basic policy for editing the "Principles of Physical Therapy:" The existence and the contents of the work of physical therapy (therapists/science) can be included in the philosophy and methodology of habilitation and rehabilitation, and the original duties of physical therapy might have been not adequately understood or even recognized by the people, including those who are involved in other healthcare, medical, and welfare fields.

The reason for this is that we reflected that this situation was also partly attributable to our (physical therapists') inadequate interpretation, and we reconsidered the modality of physical therapy soon after. Then, from the viewpoint of reflecting the past results of the role served by physical therapists as part of the community-based integrated care system, such as health promotion including prevention, independence support from the acute to living phases, reduction in fall risk, improvement of living environment, and amelioration of the functioning of people with participation restrictions, we were able to publish the JPTA-initiated "Principles of Physical Therapy."

We are working in the midst of an acutely and drastically changing era including Covid-19. I hope that this book is used as a reference and becomes a guidepost to our future.

I would like to use this opportunity to offer this book to our former presidents who led the JPTA: Satoshi Matsumura (deceased) the second and fifth president, Takashi Nomoto (deceased), the third president, and Yataro Yago (deceased) the fourth president.

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Committee for Developing an
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Kazuo Kurosawa, Chairperson

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