International Seminar on

Actual Status and Issues facing Older Persons with Mobility Impairment

- disabilities in older age and ageing of persons with disabilities -

November 8, 2014

National Rehabilitation Center for Persons with Disabilities
Japan

(WHO Collaborating Centre for Disability Prevention and Rehabilitation)

This report is available to read on a website of the Center
http://www.rehab.go.jp/english/whoclbc/seminar.html

Program

Time & Date : 13:00～17:30, November 8 (Sat.), 2014
Venue: National Rehabilitation Center for Persons with Disabilities (NRCD)

Facilitator: Seishi Kato, Director, Research Institute, NRCD

13:00 *Opening Address*
Kozo Nakamura, President of NRCD

13:10～ *Keynote Lecture*
"Disability and Ageing; WHO perspectives and responses"
Pauline Kleinitz
Technical Lead of WHO Western Pacific Regional Office

break

14:00～ *Presentation*

1 **"Current Situation of Ageing and Related Disabilities in Korea"**
Seong Jae Lee, President, Korea National Rehabilitation Center

2 **"Introduction to Rehabilitation Status of Elderly Stroke Patients in China"**
Chen Li Jia, Head, Neuro Rehabilitation, China Rehabilitation Research Center

3 **"Implication of Sarcopenia and Frailty in Older People"**
Hidenori Arai, Professor, Human Health Sciences,
Graduate School of Medicine, Kyoto University

4 **"Cervical Disorders in the Aged with Special Reference to Athetoid Cerebral Palsy"**
Atsushi Seichi, Director, Orthopaedic Surgery, Mitsui Memorial Hospital

5 **"The Status and Problems in the Aspects of Physical Function and Daily Life of the Elderly with Spinal Cord Injuries**
- in terms of physical function and caregiving -
Makoto Ohama, Vice-president, Spinal Injuries Japan
Chairman, Japan Spinal Cord Foundation

6 **"Health Promotion in Persons with Mobility Impairment"**
Toru Ogata, Director, Center of Sports Science and Health Promotion, NRCD

break

16:20 ～ *Discussion between lecturers and Q&A with audience*
Facilitator: Setsu Iijima
Director, Rehabilitation Services Bureau, NRCD

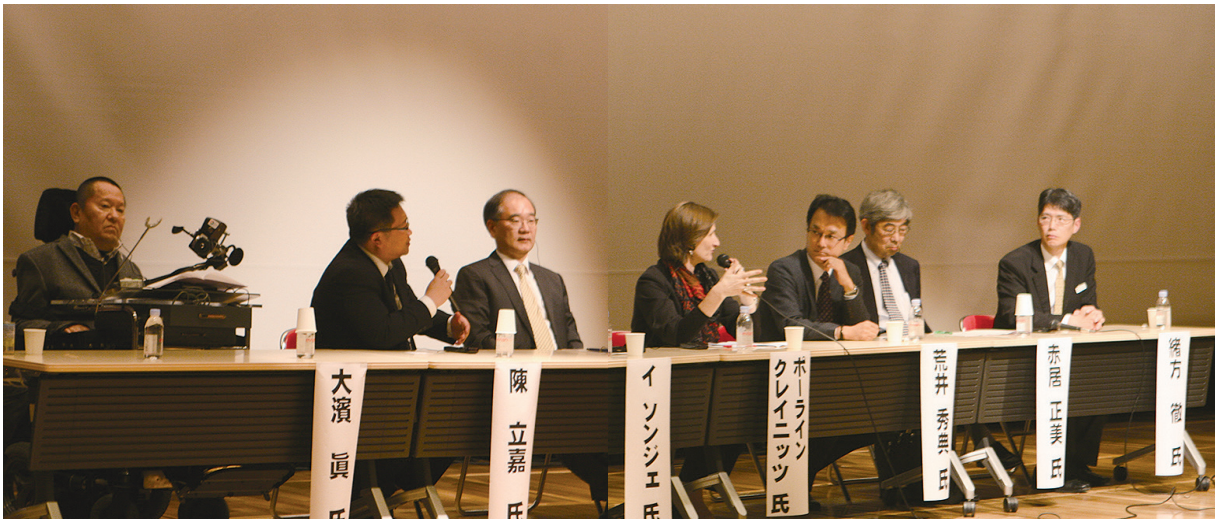
Panelists
Pauline Kleinitz
Seong Jae Lee
Chen Li Jia
Hideaki Arai
Makoto Ohama
Masami Akai, Adviser of Research Institute, NRCD,
Professor, International University of Health and Welfare, Graduate School
Toru Ogata

17:30 *Closing Address*
Setsu Iijima, Director of Rehabilitation Services Bureau, NRCD

Opening address Kozo Nakamura

General facilitator Seishi Kato

Discussion facilitator Setsu Iijima



Discussion

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Opening Address

Kozo Nakamura
President
National Rehabilitation Center for Persons with Disabilities

The National Rehabilitation Center for Persons with Disabilities holds international seminars as part of the WHO Collaborating Centre for Disability Prevention and Rehabilitation. Today's topic is, as it was mentioned by Dr. Kato, the mobility impairment in the elderly and ageing of persons with disabilities.

In Japan, the population of elderly individuals as you may know is rising at a speed incomparable to that of other countries. At present, the elderly constitute more than 25% of the total population. As this trend is expected to continue, at the peak time 1 in every 2.5 people will be considered as elderly. And the issue of the ageing population will not be limited to Japan but also among countries in Europe, the Americas, and Asia. While the pace may differ from country to country, an increasingly older population will be a worldwide challenge that we have to face altogether as a common issue.

Among the views presented at the WHO World Report on Disability, analysts concluded that the number of people with disability is rising and the contributing factors are ageing of the population and the higher rate of disability among elderly populations.

In this seminar, we would like to present two sides of this issue, the presence of disabilities that occur as one ages, and the changes in bodily functions among the disabled as they age.

For this seminar from WHO, where they pursue a way to better preserve health worldwide, there will be an introduction as of their outlook and response to disability and ageing. And we will also hear the reports on the current state of ageing and disability in South Korea as well as the stroke among elderly in China.

From Japan, new problems related to bodily functions occurring in the elderly, problems among people with disability as they age and a report on current status by a disabled person himself will be introduced. Finally, efforts offered by this Center towards promotion and maintenance of health among disabled persons will be reported.

Through this series of presentations, I hope that we can deepen the debate on mobility impairment by addressing these topics related to support for and changes in the bodily functions among disabled individuals in an ageing society. Given the large number of participants, I am hopeful that this will be a fruitful seminar.

Thank you very much and now I would like to officially open this seminar today.

Keynote Lecture

Disability and Ageing ; WHO Perspectives and Responses

Pauline Kleinitz
Disability and Rehabilitation Technical Lead,
Western Pacific Regional Office, WHO

〔Biography〕

Pauline hails from Australia and holds a Bachelor of Applied Science in Physiotherapy and Master's Degree in Social Science, International Development. Prior to joining WHO she worked for the Nossal Institute for Global Health at University of Melbourne where she undertook lecturing, research, program management and technical assistance roles in disability and public health. Before this Pauline worked for an international non-government organisation focused on disability and spent two years managing a Community-based rehabilitation programme in Malawi, Africa. Pauline has worked in the disability sector for over twenty years; this has included early-childhood intervention services, special education settings and rehabilitation services in paediatric and adult hospital settings.

Pauline joined the WHO team in 2011 and is the Disability and Rehabilitation Technical Officer for the World Health Organisation in the Western Pacific Regional Office. She coordinates the disability and rehabilitation programme across the region providing technical support to WHO Country Offices and Member States in a range of areas, including disability inclusive health, rehabilitation, assistive technology, community based rehabilitation and disability data.

〔Summary〕

There are only two types of people, those that have a disability and those yet to have a disability. As we age most of us will experience disability, but what do we know about this trend and what should we do to address it? Ms Pauline Kleinitz will share global and regional epidemiological data regarding health and aging and highlight the intersections between ageing and disability. She will share WHO efforts to address both ageing and disability and share reflections on opportunities for greater synergy.

Disability and Ageing; WHO Perspectives and Responses

Pauline Kleinitz
Technical Lead, Disability and Rehabilitation,
WHO Western Pacific Regional Office

It is a pleasure to be here again and I would like to take this opportunity to thank the NRCD for convening this meeting and for choosing this subject, a very important one, and for their leadership and their initiative in this area of disability and ageing.

I work for WHO and I am based in our regional office in Manila, Philippines. I lead the disability and rehabilitation program across the Western Pacific region, that includes countries as far north as Mongolia and China, Cambodia, Laos, Vietnam, Malaysia, Philippines, and then down into the Pacific. Our concerns as an agency are often with low and middle-income countries in the region. When I run through this presentation today, I will share some global perspectives but highlight the situation in the middle and low-income countries.

Today I will talk first about ageing and health and capture some of the demographic trends that are occurring. I will obviously highlight the fact that as we age, we often have functioning difficulties and so there is increase in disability, but also look at the other intersections that people with disabilities age and can have additional challenges. And then share with you the WHO responses across both ageing and disability programs.

Within WHO, there is an ageing program that provides technical assistance and guidance to countries on ageing similar to the program that I lead for disability and rehabilitation. I will share the approaches our programs are using and highlight where we are linking.

These first two slides are about the speed in which populations/countries are ageing in our region. This slide highlights the countries that are within the Western Pacific region of WHO. And you can see in the graph here, the dark purple is 2010 and the light purple is 2030. And the proportion of the population aged 60 years and over is the vertical column.

We can look first at Japan that you have this high proportion of an aged population. And in the next 20 years, from 2010 to 2030 there is an increase of roughly about 5%. In Korea over that same period there is an increase of 10-15%, and similarly, China has more like 10% increase.

The speed in which populations in countries age has a significant impact on socio-economic dynamics. Ageing population is not just limited to the high-income countries, even a country like Vietnam or Fiji, who do not have as strong economies and nor very strong health systems, t these populations are also ageing quickly and so increases happen in a very short period.

I share the next slide. It is a similar slide highlighting the speed of population ageing. You can see Australia, from 1940 to get from 7% of the population aged over 60 to 14%, was nearly a 50-year period, and Japan was probably about a 40-year period there. But if you look at countries up here, Cambodia, Laos, they go from 7% of their population aged over 60 to 14% of their population aged over 60 in a period of often less than 20 years. This really highlights the speed of ageing.

For example France, which is not on this, France took 100 years to get from 7% of its population to 14% of its population aged over 60. The gradient of this line tells us the speed of ageing. Undoubtedly, has an impact on socio-economic development, when populations ageing quickly countries are not always economically 'prepared' with the social protection mechanisms, pensions, social support systems, and of course strong health systems in place.

This particular graph shows labor force participation of the population 60 years and above in our Western Pacific region. I highlight that a lot of the lower-income countries are up there with very high percentages of their population still in the labor force because often there is not a choice; they have to stay working to survive.

In terms of ageing, one of the other trends is that there is a greater proportion of women that are older than men. This graph is showing us the number of men per 100 women, and there is actually less men per 100 women in most countries. There is an exception in Brunei. But mostly we know there are more women than men in older populations

If we look at healthy life expectancy, we do not see women are healthier – they are living longer but not necessarily healthier. So, women will live longer than men but they actually spend proportionally fewer years in good health. We have to keep in

mind ,this gender perspective important . It is good to see Japan and Korea up there with healthier ranges.

This slide illustrates the contribution differ health conditions make to DALYs Basically this is telling us t that non-communicable diseases t are contributing most significantly. So while we look at the burden of disease and look at DALYs, Disability-Adjusted Life Years, which include premature death as well as the impact of disability, we actually see that Group II, the green color is the non-communicable diseases, and it is by far the biggest contribution.

Let us just look at these graphs for a minute. They come from WHO's world report on disability. These graphs are show that the prevalence of disability in countries increases significantly as populations age.

So when WHO undertook the 2004 World Health Survey, there were over 70,000 respondents. This provided a large dataset across many countries, low, middle, and high income countries. And you can see, we used a particular cutoff measure for disability and found – as you might know, WHO has estimated that about 15% of the global population experience difficulties functioning, essentially disability. So 15% is the new WHO global estimate for disability prevalence. And what this graph shows is that while we might have disability prevalence around 15%, from your 50s and to your 60s, it increases significantly; and obviously 75+, we have over 50% of the population.

You can see, in the lower-income countries disability tracked higher. Disability is more prevalent and having a greater impact all the way through the lifespan in lower-income countries than in higher-income countries. And this actually shows that there were more women with disabilities, with functioning difficulties and that tracked higher all the way through the lifespan. In Australia, 64% of people with disabilities are over 65 years of age. In South Africa, it is almost 81%. So we know that older population contributes significantly to measures of disability.

I would like to mention the Disability-Adjusted Life Years concept. Some of you will be familiar with it, DALYS includes both premature death and the years lived with disability with a waiting of different diseases and the impact.

Obviously, if we looked at DALYs measures for the whole population, including young people, we see different results. But if we use it from age 60 and above and we

actually note the disease conditions that are contributing most to disability and premature death, you can see ischemic heart disease, chronic pulmonary disease, stroke, vision, and dementia, and lower respiratory are here. These colors reflect countries – the red is high income, orange middle income, and aqua is low income. What we see is that across high income to low income, there are some similarities. There are similar trends, for example heart diseases and strokes. And much of this of course is caused by a broad category of non-communicable diseases.

We used to often say that some of these diseases were 'diseases of the rich' or of a 'rich lifestyle' But this is not actually the case. The lower income countries are often experiencing the same levels of heart disease and cardiovascular disease; but it is even a greater burden because they are not being managed. In low-income countries people commonly might not have their blood pressure checked, and not have access to blood pressure medication, this means they have health conditions that could be well managed in high income countries.

If you look at vision, it is interesting to see the difference in a low income country versus a high income country. And that is often because a lot of the visual disorders can be corrected such as through cataract surgery. But in low income countries cataracts are still a significant contribution to blindness. Lower respiratory infections, again they are worse in the lower income countries because less healthy environments in terms of the air, air pollution, even in terms of smoke in the homes, and not the same access to the medications and health.

This slide is reflecting years lost due to disability, YLDs; so not reflecting premature death, just reflecting functioning difficulties / disability. , By removing the death component in DALYs, we see what disease conditions contribute to the disability in the older population or people over age 60. Vision is really at the top there, dementia second, hearing, then osteoarthritis. When we take out premature death, these drop right down; ischemic heart disease for example. Vision particularly is a big contribution as is hearing often in terms of the years lived with disability. And you can see the difference from a high-income to the low-income again in the vision for the reasons I mentioned earlier.

The interesting thing actually is though that these top four are the same. It does not matter if it is high or low income. These are vision, dementia, hearing, osteoarthritis. These are all contributing most to the disability that people experience.

This slide provides little more information – I have mentioned vision and it just shows interestingly the contribution in terms of years lived or lost, lived with disability from visual impairment per 100,000 adults over the age of 60. And you can see what this really represents is the difference in health systems.

When it comes to refractive errors, you can see high income 762, low income 3919. Why is that so much bigger in lower income countries? Quite simply, most people still cannot access glasses in low income settings. And similarly cataracts, you see again a big difference from high income, 136, versus 2492.

In these kinds of conditions, cataract and refractive errors we have health services that make a big difference. But if you look at glaucoma or macular degeneration, they are not as easy to treat medically, so there is not quite the same difference between the low and high income countries.

You can see again a similar trend with dementia, it is not very different from high income to low middle income. And that is because again we do not have many medical interventions that prevent or reduce the impact of dementia particularly. So what this is reflecting is that we can change the burden of disease, through our health interventions.

What I have really captured there is the impact of ageing on populations and of course how that results in or how that relates to disability. But let me just pause for a second, because obviously there are these other intersections. And I want to highlight first and foremost the other key intersection is that people who have a disability, from birth or from younger in life, also age and obviously there is the impact of ageing on top of the disability.

WHO has not delved very deeply into this topic partly because there is limited amounts of evidence and research documenting and talking about how people with disabilities age and the impact of that ageing on the disability.

We know that trends occurring in the general population also occurring to people with a disability on top of their health condition and the impairment they already have.

Today, I think some other speakers will probably talk more about this than I will. But there are a couple of points to keep in mind on this overall subject. And this is that

some groups of people with disabilities, for example some syndromes, like Down syndrome, which results in premature ageing. People with Down Syndrome age and some ageing impacts occur earlier.

The other thing I want to highlight, because it is a big issue in many countries, is older parents caring for children with disabilities. This is something in terms of demographic trends and responses that we need to keep in mind. Parents often play a fantastic, supportive and key role in their child's life, but as they age they are not able to provide that same caring role. And as government and societies, we need to be aware and address this whether through development of respite services or the community residential settings for people with disabilities.

I would like to now talk about the responses, in the high level responses that the World Health Organization is undertaking in regards to ageing and disability.

First of all, I share with you two WHO regional strategies for ageing. This one is from our Europe region, which reflects more high-income countries, but it is similar to the strategy that we have in the Western Pacific region.

You can see that in terms of broad responses WHO is promoting, it is about promotion of 'healthy ageing' over the life course, so developing good exercise habits, good eating habits, all those good non- healthy activities.

The second strategic area is the environment. Promoting age-friendly environments, providing environments that are accessible, that are inclusive of older populations. The third one is about people-centered health, long-term care systems fit for ageing populations. So we know that whether it is through health systems being more orientated towards chronic disease as well as more long-term care systems. And then, about evidence and research.

You can see that bottom list of priority interventions that WHO has identified. In general, it is very much about promoting physical activity. We know physical activity is very important for addressing the impact of ageing, falls prevention, things like vaccinations for older people and public support, informal caregiving, and then the geriatric and gerontological sectors.

So, that gives you a flavor for what is happening and what the priorities are for Europe, which is probably quite a good fit for countries like Japan and Korea.

Our Western Pacific framework is quite similar, very similar. We have the same concept of fostering age-friendly environments through action across sectors, promoting healthy ageing across the life course and preventing the functional decline or diseases that are common among older populations. Prevention of functional decline is often involving the exercise and assistive technologies.

WHO obviously is doing many things in the area of ageing; we are developing a world report on ageing and health'. We are provide technical assistance at country level to help countries adapt and make the policy and program decisions that support older populations.

I share now our Global Disability Action Plan, which highlights the approach the disability program is taking. And this is within WHO, so focused on health. This is a brand-new action plan so I will share with you. It is from 2014 to 2021 and was endorsed in our World Health Assembly in May this year. It is focused on achieving 'Better health for all persons with disabilities'.

WHO is one of a number of UN agencies involved in disability. The WHO role is focused on health. In our Global Disability Action Plan, objective 1 is to remove barriers and improve access to health services. Objective 2: is strengthening, extending, rehabilitation, habilitation, assistive technology, assistance and support services, and community-based rehabilitation. Objective 3 is on strengthening relevant and internationally comparable disability data and support research.

These kind of responses are often high level, so under each of these objectives we have a series of actions and I do not really need to go through these. But you can see, under objective one, is looking at health systems and suggesting that actions to make sure our health policies and program are consistent with the Convention on the Rights of Persons with Disabilities. And it is about developing leadership, supporting health financing, service delivery, overcoming the specific challenges to quality of healthcare experienced by people with disabilities, and meeting specific needs in emergency situations.

Actions under objective 2 are a little similar. We are talking about supporting rehabilitation, assistive technology and other more targeted services. Again, actions focus on leadership, resources, workforce; strengthening of services, the assistive technologies, and supporting the assistance and support services. What we mean by

assistance and support services that are services like sign language interpreters, employment services or personal assistants. The final action is to keep working with people with disabilities and their families.

Three actions under the third objective which is probably not surprising, around data collection and research.

I now want to share some reflections. In terms of these two areas of disability and ageing, globally and even regionally these programs are moving forward, they are supporting different issues but have a little overlap Ageing and disability can be quite similar issues in how they are understood and addressed The human rights approach should guide them both and while the Convention on the Rights of Persons with Disability exists, and there is not yet one for Ageing, I think in future there will be with much discussion and plans underway.

Other similarities are that both older persons and people with disabilities are significant population groups in society. And often share issues of stigma and negative attitudes or some discriminatory practices.

Another important similarity is that the role of the environment is crucial. We know that disability is not just about the health condition , disability is about the impact of the impairment in the environment, meaning it is the outcome of this interaction. So having either accessible environments, age-friendly or disability inclusive environments is important for both these population groups and require similar adjustments.

There is increased health needs by both these population groups. So while you can get old and be very well, and you can have a disability and be very well, there are obviously some people with disabilities and some older people have higher healthcare needs. So we often need health systems to be available, to meet general health needs but also to meet specific health needs that relate to the disability or to ageing.

There are similarities between these groups in preferences to live and be in their homes and local communities. Most people want to be accessing services that are close to home and close to their local community; so service orientation to the community is important.

And, another similarity is that ageing and disability concerns are often led nationally by the Ministry of Social Affairs. So, when we are working to ensure the health sector

responds adequately there can sometimes be challenges in getting this issue prioritized adequately by health.

We also have some distinct differences, which is interesting, for example, the simplicity to measure ageing. Because disability is on a spectrum, we do not have that same clarity – and again particularly in low and middle income countries we lack data about the disability population because we do not have good measurement tools in place.

We need whole health systems to adapt and include the development of these specific services, but in particular the social protection mechanisms and making sure that health is affordable and linking to the UHCs, the Universal Health Coverage. WHO talks a lot about UHC, but really making sure that packages for people with disabilities whether it is rehabilitation or support for chronic health conditions are in UHC, it is similar for disability and ageing populations.

Finally, health promotion is an area where I see distinct differences. The health and disability sector have not worked together in this area. There has not been strong advocacy for more inclusive health promotion nor targeted approaches. I believe the complexity of relationship between health and disability and the historical and often political concerns between the two mean that disability and health promotion has been limited to date.

So, I have shared the broader demographic health trends, some of the intersections between health and disability and then some of WHO's responses to both these issues. There is definitely potential for us to learn more, to keep building the evidence base, to know these population groups better and to know how governments can best respond.

I am very much looking forward to the rest of the discussions this afternoon and thank you very much for your attention.

Presentation

Current Situation of Ageing and Related Disabilities in Korea

Seong Jae LEE, MD, PhD
President, Korea National Rehabilitation Center,
Seoul, Korea

〔Biography〕

Education

MD, Seoul National University, College of Medicine, Seoul, Korea (1987)
MSc, Seoul National University Postgraduate School, Seoul, Korea (1998)
PhD, Seoul National University Postgraduate School, Seoul, Korea (2004)

Postgraduate Training

Residency in department of Rehabilitation Medicine, Seoul National University Hospital, Seoul, Korea (1992-1996)

Positions Held & Faculty Appointment

Professor, Department of Rehabilitation Medicine, College of Medicine, Dankook University (1996-present)
Vice Dean, College of Medicine, Dankook University (2009-2013)
Director, Department of Rehabilitation Medicine, Dankook University Hospital (1998-2013)
Visiting Professor, University of North Carolina Medical School (2001-2002)

〔Summary〕

Ageing is a global issue nowadays. In Korea, the official number of registered people with disabilities (PWD) has already exceeded 2.5 million (4.9% of the entire population). More than one-third of them are elderly. Due to longer life span and a decline in birth rate, the number of older PWD is dramatically increasing in Korea. The cost for health care of the senior citizens is also increasing. As a result, appropriate management of health care of aged people is becoming one of the urgent issues to be solved. We reviewed the current status of health and disabilities of PWD and senior citizens in Korea. In addition, we summarized the policies and research activities for PWD and elderly in Korea National Rehabilitation Center. Some of the translational research for rehabilitation robots, health promotion programs for the disabled people and cognitive assessment for driving of elderly were mentioned. We also tried to suggest plans (1) to construct rehabilitation infrastructures, (2) to build up customized rehabilitation programs and (3) to operate health management programs, which were designed to fit the fragile elderly.

Current Situation of Ageing and Related Disabilities in Korea

Seong Jae Lee
President
Korea National Rehabilitation Center

Thank you for the introduction and I also thank President Nakamura and all the members of NRCD for inviting me to this valued seminar.

Today, I am going to talk about the current situation of ageing and related disabilities in Korea.

Okay, I would like to give you a very brief review of the status of ageing and disabilities in Korea and then I also would like to introduce some of the activities for people with disabilities and the senior citizens in Korea National Rehabilitation Center. And then I will conclude my talk with a few suggestions for the rehabilitation of elderly and people with disabilities.

Now the status of ageing and disabilities in Korea is actually very simple.
Korea is getting old too fast. Please take a look at the graph. The blue line this one. The blue line indicates the elderly populations aged 65 years or more. You can see the slope is very steeply going up. And the statistics demonstrate that the elderly population increased continuously in recent 40 years. We are about here. We expect it will increase continuously in coming years reaching close to 37% in 2050 here. The green and the purple line is showing the other age groups going down all so fast.

Korean government has a registry system for the people with disabilities. Its purpose is to provide welfare services and support them financially. The number of registered people with disabilities has been increased annually until reaching plateau in 2010.

As of 2013, 2.5 million have been registered, accounting for 5% of entire population. More than 90% of disabilities are acquired ones and the increase should be related to the rapid growth of elderly population. Moreover, the demand for improving medical care and welfare is also increasing.

Korean Disability Law defines the categories of disability by which the registry is classified. Their number has been increased for the last couple of decades. In 1989, the

categories were only five, but now a total of 15 categories are defined in the law including not only physical disabilities but also mental and medical illnesses.

This graph shows the distribution of the registered disabled people according to the disability category. Physical disabilities are most common and auditory, brain, and visual disabilities are also common. However, many musculoskeletal and nervous disorders such as peripheral nerve injuries and spinal cord injuries are all mixed up in the physical disability category and maybe we need to divide them into more detailed subcategories.

Prevalence of disability increases in accordance with ageing in Korea. With increasing age, the disabilities increase exponentially. This graph suggest that disability and rehabilitation of the elderly should be one of the major issues in ageing societies such as Korea, Japan, as well as China.

Likewise, the number of older people with disabilities is also increasing as the elderly population increases. Elderly population makes up to 40% to 50% of the people with disabilities, as you can see here, while it takes only 10% to 12% of entire population.

The increase must have been caused by ageing of the people with disabilities. But we also can speculate that many elderly people are being disabled as they are getting old. It means that we should be prepared for rehabilitation of the older people with disability as well as preventing the elderly from being disabled.

The increasing health cost becomes a major issue in most ageing countries including Korea.

In the first half of 2014, Korean National Health Insurance database showed that the medical cost has increased 6% over the same period in 2013. However, the increase was 8% in elderly group over the age of 65 years or more. Medical cost for elderly population occupies 36% of the total medical cost.

The average monthly medical cost was four times higher in the elderly than in the younger age groups. The monthly visit to the medical facilities was also three times more in elderly group. The data shows that elderly cost more money for medical care and visit hospitals more often.

Korean national survey of the health status conducted in 2010 to 2012 showed that the elderly had a healthy lifestyle compared to younger and middle-aged groups. On the

other hand, their health-related quality of life was poorer, being susceptible to chronic disease and loss of function.

A quarter of senior citizens had restrictions on daily life and social activities by the healthy problems or disabilities.

Using the score of health related quality of life index, EQ-5D, elderly group showed lowest quality of life in comparison with other age groups. This is over 65 year group, with much lower score than the other age groups.

According to the World Report on Disability published by WHO and World Bank, it is evident that people with disabilities are more vulnerable to age-related conditions than those without disabilities. The ageing process begins earlier than usual in some groups of people with disabilities. The ageing process and associated changes such as presbycusis, deconditioning, loss of strength and balance, osteoporosis, may have a greater impact on people with disabilities.

For example, people with Down syndrome have a higher incidence of Alzheimer disease than the general population. People with intellectual impairments unrelated to

Down syndrome also may have higher rates of dementia. People with existing mobility impairments have a higher rate of functional loss.

The next subject I would like to tell you is the activities for the people with disabilities and senior citizens in Korean National Rehabilitation Center.

Driving is now one essential part of life in Korea. Korean National Rehabilitation Center is making effort to help the elderly and disabled people to drive safely. The Cognitive Perceptual Assessment for Driving, CPAD, is an assessment tool designed to test driving ability of the people with brain impairments. CPAD was developed by KNRC and two other co-investigators in 2003.

Recently, it has been incorporated into an educating program that is performed for the elderly drivers by the driver's license offices. CPAD consists of eight subtests that have been known to be related to driving. Each subtests score is standardized and weighted. According to their composite total scores, participants assessed as pass, borderline, or fail.

These are subtests of CPAD, Depth Perception, sustained attention, Divided Attention, Stroop Test, Digit Span Test, Field Dependency, Trail Making Test A and B.

The test is basically PC-based and the examinees use joysticks and touchscreens to get the test.

KNRC collaborates with the police, the road traffic authority, and insurance companies. CPAD is currently being used for educating elderly drivers in the 26 regional driver's license offices throughout the country. The elderly who pass the CPAD test and complete the education program can receive 5% discount of auto insurance.

KNRC's other effort is related to the robotics and translation research. KNRC launched Translation Research Program of Rehabilitation Robots, TRPRR, last year. Basically, translational science is a cross-disciplinary scientific research that is motivated by the need for practical applications. Many researchers are saying that there is a so-called 'Valley of Death' between the basic science and clinical research. TRPRR aims to fill the gap between the laboratory and field.

TRPRR has following objectives. It should provide the best infrastructures for rehab robots that should be made more user-friendly to the elderly and people with disabilities. It should promote links between existing technology-driven R&D and clinical researches.

TRPRR seeks technology upgrade throughout clinical feedback. When the feedback by clinical research combines with engineering research, technologic enhancement of rehabilitation robots can be obtained.

To achieve those objectives the first part of plan should be building testbeds for rehab robots, and the next part will be translation research for rehabilitation robots consisted of intramural and extramural R&D projects.

KNRC is conducting another project related to the rehab robots which is called the Rehabilitation Robot Business Support Program. We select well-designed rehab robots every year and provide them to the testing institutions chosen from the relevant organizations and rehab hospitals.

application improvement instead of being supplied of free robots. This program is an example of a multi-organization program funded by government budget. Its main purpose is promoting the market business of the rehab robots and improving the quality of life of people with disabilities, and senior citizens.

Since 2012, six kinds of rehab robots commercially available in Korean market have been selected and provided to the testers. The examples are gait training robot, arm and hand rehab robot, transfer robot, and self-feeding robot.

KNRC also conducted a research related to the frail elderly. The community-based customized rehabilitation program for disability prevention was 3 months' community-based, single-blinded, randomized, and controlled clinical trial. We recruited frail elderly with three or more symptoms among weight loss, low emotion, low grip strengths, low walking function, and low physical activity. Among the subjects, experimental group performed the rehabilitation exercise, and controlled group only learned the fall prevention.

The results showed that physical functioning significantly improved more in the experimental group that in the control group. After completing 3 months' program, health conditions improved more in experimental group than in the control group. 47% of the subjects improved from frail to pre-frail, and about 5% frail to non-frail in the experimental group; while 16% changed from frail to pre-frail, and 2% frail to non-frail in the control group. We concluded that rehabilitation exercise program can help the frail elderly improve their functional performances.

Disability with ageing is one of the major demands for rehabilitation in the future, so KNRC is making three-step plans to overcome it. The first step is construction of the infrastructures for rehabilitation of older PWD. The second one is operation of the customized rehabilitation program for the older people with disabilities. The last one is operation of the health management program for the fragile elderly.

Now I would like to finish my talk by making a few suggestions.

Korea is one of the most rapidly ageing countries in the world. Disability prevalence ratio increases in accordance with ageing and the number of older people with disabilities is also increasing in Korea. Aged people are potentially disabled and people with disabilities are more vulnerable to ageing related conditions. Rehabilitation of the aged people is one of the emerging needs and we must be prepared for it. Korean National Rehabilitation Center suggests robotics and customized rehabilitation exercise program as solutions.

Thank you for your attention.

Introduction to Rehabilitation Status of Elderly Stroke Patients in China

Chen Li Jia
Head of the Neuro-rehabilitation Center,
China Rehabilitation Research Center

〔**Biography**〕

1987 Graduated from China Medical University

1987 Began career at the China Rehabilitation Research Center

1987-1992 Physician, Department of Functional Rehabilitation, followed by Neurology and Neuro-rehabilitation , China Rehabilitation Research Center

1989-1990 Trained in stroke rehabilitation at National Rehabilitation Center for Persons with Disabilities, Kanagawa Rehabilitation Center and Tokyo Metropolitan Geriatric Hospital

〔**Summary**〕

According to the Fifth National Population Census of the People's Republic of China (2000), the total number of people over the age of 60 constitutes 10.33% of the population, thus making China an aging society. The incidence of stroke in (continental) China is the highest in the world, and stroke has become the leading cause of mortality from disease among its citizens. More than 10 million patients survive a stroke each year; among these survivors, almost 80% have a disability.

Stroke rehabilitation in China began in the 1980s; after 30 years of development, a tertiary rehabilitation network has been formed. In 2011, the “Chinese Stroke Rehabilitation Treatment Guidelines” were developed. The progress of stroke rehabilitation is managed following a clinical path. Several organizations and facilities perform stroke rehabilitation for elderly adults. While these resources are beneficial, a number of problems have arisen, and the development of a new approach is necessary. This presentation will discuss how stroke screening and prevention projects sponsored by the Ministry of Health will help facilitate new rehabilitation approaches in China.

Introduction to Rehabilitation Status of Elderly Stroke Patients in China

Chen Li Jia
Head, Neuro Rehabilitation Center,
China Rehabilitation Research Center

Ladies and gentlemen thank you all very much for having me. It is a great honor for me to share with you the other rehabilitation status of elderly stroke patients in China. As you all know China is huge country and accordingly the population is also a lot.

In 2010, the national population was 1.34 billion but this year I think it is even close to 1.4 billion. And as mentioned earlier, yes china is an ageing society. Well in the year 2000 we had the fifth national population census and without knowing we were already considered as an ageing society at that point. The number of people aged 60 years or older accounted of 10.33% of the total population and until 2013 we were almost at a peak or the peak of ageing.

For the next 20 years or so since 2013 the trend will continue and the population of the elderly will be more than 400 million. Those who will be older than 80 years old will be like 100 million or so. Compared to some years ago, the population of the elderly will be even greater.

As a result of this, partly of this ageing, we see more and more cases of stroke. And look at the stroke incidence data, it is quite high. Per 100,000 people we have 219 cases of stroke incidence and the rate is increasing every year. In 2007, we had about 2.8 million who were newly diagnosed as a stroke. But in year 2020, the number is predicted to reach 3.7 million people.

Since 2004 and 2005 we had the third national survey of the census and we found out that the top reason for death was stroke. And the trend is the same in 2008 and mortality rate is around 22.45%. Further, rate of disability due to stroke is very high. Among stroke survivors, 80% of them developed physical disabilities and approximately 10 million or more stroke patients survive every year. But at the same time, according to another survey we have found out that what is most likely to recur is stroke, and currently the recurrence rate is considered to be 41%.

Further, subjects aged 60 years or older account for 50% or more of stroke patients. Compared to other countries, the figure is a little lower; however, this also tells us that we will have a more significant impact in the later years. Now, under such a circumstance what kind of rehabilitation status do we have now? Well, in the last century during the 1980s, China saw the development of rehabilitation. We have affiliation to the National Federation of People with Disabilities and China Rehabilitation Research Center is one representative facility.

In addition, we have affiliations to the Ministry of Health such as Hebei Provincial Hospital's Rehabilitation Center, Beijing Xiaotangshan Rehabilitation Center, Liaoning Tanggangzi Rehabilitation Center, and Guangdong Conghua Rehabilitation Center.

Well, during these 30 years we saw emergence of so many different types of institutions and facilities. Although it is good to have many facilities and institutions, but there are so many different formats with the different programs. And unfortunately, most of the facilities and institutions are not really specialized in various experienced institutions, they may just another nursing homes or sanatoriums and there is not consistency. And also, in addition to China Rehabilitation Research Center we have other privately-operated rehabilitation institutions and facilities. There is so much inconsistency among all these organizations.

Now, in accordance with our learning over the 30 years we have made extensive research. We have had extensive experiences. And as a result we have developed this treatment guideline for stroke rehabilitation in China. This was published in 2011. We asked all the specialists working at China Rehabilitation Research Center and also we asked other experts of rehabilitation from different organizations to work together.

And with this guideline I think that we are able to make overall evaluation of rehabilitation and treatment. And further, we now are able to evaluate risks in a comprehensive manner and safety is confirmed. Further, based on this guideline we are able to continue applying new technologies and intensification or improvement of standardization of treatment. And one of the suggestions made in this guidebook is to develop a rehabilitation system.

This is for acute stroke rehabilitation system. We have different levels of hospitals, different levels of institutions and the one on the top, it says level 3 hospital. This is a really high level hospital where the acute phase patient can be treated. At this level, the

patient can receive treatment for acute stroke. And then, one step down it says level 2: rehabilitation department in a general hospital.

This is for patients who are still in hospital but who are in the recovery phase and they can receive rehabilitation processes and programs within the hospital. Now then, one more step down you has stroke rehabilitation centers and a community-based rehabilitation. This is sort of the third level rehabilitation system. This is quite important for those who have completed the initial treatment and who have completed initial phase of rehabilitation. To prevent stroke from recurrence, this level is really important.

All these have to be integrated and there has to be good alignment among all the institutions and facilities involved. If we can have this complete network, a stroke patient can receive therapy and rehabilitation program throughout the cycle – from the acute phase throughout his or her life. We are trying to develop this nationwide but there is a long way to go. Well in the clinical setting we are using clinical critical path. Since 2009, the Ministry of Health will introduce therapeutic management based on clinical critical path in order to plan rationale time sequence for conducting diagnosis and treatment on the basis of a single standard criterion for each disease pattern.

I would like to share with you this cerebrovascular thrombosis clinical critical path form. This is a case for middle cerebral artery cerebrovascular thrombosis.

Well this is in Japanese but as you can see we have this document that we can refer to whenever we have stroke patient. Now, using this clinical critical path we are hoping and we are trying to improve the quality of stroke therapy and rehabilitation. As we go through this clinical critical path, we can find a lot of issues and problems. And as a result of following this critical path we can establish or we can identify what is really good for that particular patient in the long run. Here with this slide I would like to share with you on data on stroke patients at the China Rehabilitation Research Center where I work. From 2002 to 2011 we had 3049 patients and the average length of hospital stay was 82 days and the mean age of the patients was 53.77 years old plus/minus 14.19 years.

We had far more male patients than female patients. The ratio of ischemic and hemorrhagic strokes, that was around 50:50. Then further, in 2011 alone the average length of hospitalization was 62.5 days and further it was reduced to 85 days in 2013.

This means that following and making good use of clinical critical path is quite effective to reduce the length of hospitalization. Of course, we do look into all these different factors such as surgery, spasm, elevated scores for activities of daily living, time of onset, infections, complications, language deficit, type of stroke, and so on.

Doing rehabilitation programs with the elderly stroke patients, we have seen these characteristics. Because of ageing, we see cognitive disorders and urinary disorders are getting more common. And also, it is quite likely that there is disuse and misuse of rehabilitation among the patients. And also, in case of elderly patients it is likely that they have multiple comorbidities and this greatly affects rehabilitation treatment and prognosis. Further, in case of elderly patients we see that recovery and prognosis are relatively poorer and slower. Also in case of the elderly, recurrence is quite likely to occur. And to begin with, the patient's ability to perform ADL is markedly decreased.

I would like to summarize some problems for rehabilitation of elderly stroke patients. One is related to huge geographical area of Mainland China. Because the country is so big, it is unfortunate that there is quite an inconsistency and we are not able to have the complete and consistent community-based rehabilitation and stroke rehabilitation center network. The second issue that I can identify is we have the shortage of rehabilitation staff or experts and their skill levels are really varying, which is not good.

Thirdly, when it comes to treatment of stroke, the therapy or treatment is not yet standardized. Furthermore, we do not have the good enough social insurance system. We do not have support policies for these patients yet. Further, there is quite an economical financial gap among cities. If one city is financially well off, they are able to give good support to the patients; however, if a municipality is faced with a financial difficulty, it is quite likely that a patient does not receive the same level of support. Further, as for human resources, the number of caregivers is not sufficient.

And also, we see the very, very limited capacity of nursing homes. Here and there we see many nursing homes and elderly people's facilities are being built; however, they cannot necessarily deal with the rehabilitation for stroke patients.

Under such as circumstance what do we have to do? We have to try to work harder to reinforce the community-based rehabilitation system. We have to try to develop a network among high level hospitals and NCBR and also rehabilitation specialized

facilities. Doing that, at the same time we have to put more emphasis on training the rehabilitation staff and further treatment standardization is highly required.

The next bullet is about improving policies such as social insurance. When it comes to caregivers, they should be more trained and we have to develop and deploy good training programs for them. There is so much that we should learn from the experience of developed countries.

In June 2009, the National Health and Family Planning Commission of China proposed the 'Survey of Stroke Cases and Preventive Care Project' and it is still continued. The commission found that there were 200 specialized hospitals were focusing on stroke prevention, stroke treatment, and rehabilitation.

My rehabilitation research center is one of them and we hope that we can continue to play an important role in management of the stroke patients. Today, I was given this opportunity to speak to you and for this I would like to really appreciate NRCD because in NRCD is one of the very institutions that gave me an opportunity to learn on this field earlier. Thank you very much.

Implication of Sarcopenia and Frailty in Older People

Hidenori Arai

Professor, Department of Human Health Sciences,
Kyoto University Graduate School of Medicine

〔**Biography**〕

1984 Graduated from Kyoto University Faculty of Medicine, M.D.
～ Shimada Municipal Hospital and Kyoto University Hospital
1987 Entered Kyoto University Graduate School of Medicine
1991 Obtained Ph.D.
1991 Instructor at the Dept. Geriatric Medicine, Kyoto University hospital
1993 Postdoctoral fellow at the University of California, San Francisco
1997 Instructor, the Dept. Geriatric Medicine, Kyoto University hospital
2003 Assistant Professor, the Dept. Geriatric Medicine, Kyoto University hospital
2009 Professor, Department of Human Health Sciences, Kyoto University Graduate School of Medicine
2015 Deputy Director, Hospital, National Center for Geriatrics and Gerontology（NCGG）
Director, Center for Gerontology and Social Sciences, NCGG

〔**Summary**〕

In Japan, where the elderly population has exceeded 25% of the total population, measures are ongoing to alleviate care burden by prevention programs targeted at keeping individuals from requiring excessive care. Among the very elderly, frailty is a prominent cause for needing care, with sarcopenia as a leading cause of frailty. Frailty is a state of increased vulnerability to health disorders due to various changes in functioning and residual functioning that accompany aging. Frailty includes physical, psycho-spiritual, and social aspects. Among frail elderly individuals, events such as institutionalization, falling, hospitalization, and death occur more readily. Sarcopenia is a reduction in muscle mass and strength, and as the main cause of

frailty, likewise increases the risk of collapse, bone fracture, institutionalization, and death. Sarcopenia pathology necessitates early detection and intervention for all elderly. By carrying out appropriate interventions, health care professionals can prevent patients from requiring care. Nutritional guidance and exercise therapy are common intervention methods, and this symposium will summarize such screenings and interventions.

Implication of Sarcopenia and Frailty in Older People

Hidenori Arai
Professor, Department of Human Health Sciences,
Kyoto University Graduate School of Medicine

Good afternoon ladies and gentlemen, thank you very much for letting me have this wonderful opportunity. Today, I have titled my presentation sarcopenia and frailty but I think many of you might have heard this word for the first time. Sarcopenia is about the degradation of the muscles. By the muscle being degraded, various physical functions will also be degraded. And frailty is, we can say, the weakness or vulnerability and so frailty means those weaknesses; however, I will just call that as a frailty and I will not translate into Japanese.

This slide here has been pointed out by various presenters already and this is how Japan is facing the ageing societies. 25% of the population is over 65 years old. And then we can see that the people in baby boom age, about 20% of the people will be higher than 75 years old. Also, Dr. Nakamura had pointed that it is about it is about 2 out of 5 persons will be more than 65 years old.

By facing this extremely ageing society, many people will be need of the long-term care. We now have a system in Japan to support such people in the need of the care as a society. And this shows the changes from the moderate level to the more severe level. And initially we had six stages.

And as you can see, the number of the people who will be in need of the long-term care expands drastically in a very fast pace, so therefore we have introduced a concept of the prevention of the need of the care to slow down this pace. But however, it might be difficult to decrease the number of the people who are actually in need of the care; but however, we believe that we can slower the pace. Therefore, we started to introduce the concept of the frailty. The current status of the people on a long-term care need is about 4% of the 65 to 74 years old, and 30% of people older than the 75 are described here in the presentation.

This slide here shows the reasons or cause of needing long-term care in Japan, from 65 to 69 and also if you can see by the ages. If you look at the younger elderly people,

that mean what we call the earlier stage of the elderly, the largest reason is a stroke. If people gets older, the major change will be in frailty, the weakness. And of course falling and the bone fracture will also increase. But it will be important for us to start preventing from the mid age so that we will be able to prevent the frailty. I believe that it is very important for us to tackle to slower the ageing society.

Ageing means that the physical function will decrease and since we are animals, at the end we will face death. And by ageing, we will be vulnerable, we will be weak to external stress. Like for the young people, even if they stay in the bed in the hospital for 1 week, they can recover quite fast after getting out of the hospital; but however, for the people in this frailty, they are vulnerable to the external stress. So therefore, although they go out from the hospital, sometimes they still have difficulties in walking or sometimes they easily tend to fall. That is the frailty which we are talking about.

The reason why we focus on frailty is that this is also related to the falling and also the decreased activities of daily living and increase the number of the emergency room visits and hospitalization and admission to facilities and in risk of death. These are related to frailty.

This is defined by Linda Fried: weight loss, fatigue, muscle weakness, decreased walking speed and decreased physical activity, also Dr. Lee had pointed out. So, if you meet these 3 out of the 5 factors, then we can say that you are in the frailty status. If that is less than 2, we can say you are in the pre-frailty status.

This is the outcome of the cohort study but if we define the people in the frailty, if you answered more than 3 of the previous question then that means you can see that people in the pre-frail status and the frail status.

How is this frailty defined is still big discussion going on. Fried identifies it as physical frailty but in recent years there has been a growing trend to understand it is a concept that includes reduced cognitive function and depression and also sociability; that means a lack of social participation or the economic difficulties also is included in here. There is currently no global consensus on it.

From 2006 long-term care prevention program have started. And this basic checklist has started being provided to the people who are interested in. And I think the English version you have in front of you and there are about 25 questions in this basic checklist about this exercise, function of daily living and nutrition, oral cavity function, going

outside, cognitive function and depression. And by answering to all these questions in yes or no, you will add all the points relating to these answers and then return this back to the local government. For the people who has higher point is more likely to be in frailty, so therefore we better get ready for the prevention.

8000 people who answer to this checklist and not be certified who need long-term nursing care are divided into four groups. The group one is 0 to 1; group two, 2 to 3; and group three, 4 to 7; and group four is 8 to 25. If you look at how this have changed after 2 years is that this group four is the group in the highest point situation, but you can see that more people are getting the long-term care in group four.

This is to predict the people who will be likely to receive the long-term care and this has been described in the ROC. If you look at this, the point between 6 to 7 is kind of threshold. If you have point higher than 7 point, you will be more than likely to be documented as a person in need of long-term care.

Frailty is not only physical frailty, we also have mental, psychological, and social frailty. There are three domains here. There should be a diagnostic tool that will cover all these three areas. Sarcopenia is in this physical frailty and is considered as the cause of the physical frailty.

This is the cross-sectional photo of the femoral area, but you can see how the muscle is. The white part here around is the fat and this white circle in the center is the bone. As you can see, the more white lines increasing for the sarcopenic older, so that means the fat is getting into the muscles. If this is a beef, it might be tasty; but however, it is not likely for the elder person to have this kind of cross-sectional photo.

If we look at the impact of sarcopenia is that there are several risks here: falling, and bone fracture, and decreasing movement abilities, decreasing ADL, death, and various illness such as diabetes.

This is the changes in muscle mass over time. People ageing from 20 to 30, that is in the peak. And comparing people in the 30 years old and 80 years old, muscle mass will decrease for 30%. And of course there is a great individual variation, so some people might decrease faster and some people might be able to keep longer.

Nutrition, food, and exercise give an impact on this. Therefore, as you can see, there is not much difference when you are young but as you get older you can see the difference among the individual variation increased.

The word sarcopenia came from ‘Sarx’ that is ‘Flesh’ and ‘Penia’ that means ‘Loss’. Rosenberg had named this syndrome as sarcopenia in 1988 in Albuquerque. The muscle mass decreased subsequently due to ageing and Rosenberg defined to call that sarcopenia. The first symposium was held in 1994 in NIA. Health disorders happened as the sarcopenia progressed.

This is a comparison between men and women. And each line here shows the gait speed per age. So, for the person who can walk faster live longer than the people who walk slower. We can say that this gait speed also impacts the life expectancy as well.

This is the grip strength and vital prognosis and this is of men, but you can see that people whose grip strength is less than 30 tend to die earlier. We can say that there is a correlation between the grip strengths and the gait speed versus vital prognosis.

Current thinking of sarcopenia is that decreased muscle mass but not only the decreased muscle mass but also the decreased muscle strength and physical function will lead to sarcopenia. Therefore, subsequently people tend to fall that will lead to hospitalization and death as well.

The way to diagnosis have been defined and practiced in Europe. So, over 65 years old people whose gait speed is less than 0.8 meters per second, then we will measure the muscle mass. And if that is low, then we will define the person as sarcopenia. If the person walks faster than 0.8 meters per second we will measure the grip strength and if that person is low than 30kg for men and 20kg for women then we will also measure the muscle mass and then if that is also low then we will defined the person as sarcopenia. Therefore, sarcopenia is a combination of the grip strength and also the gait speed.

This slide here shows the frequency of sarcopenia among elderly Japanese people. So as the person gets older over 75 years old, the number of the people with sarcopenia increase. For sarcopenia, we can say that this will increase both in women and men.

This is the criteria in Asia. In Asia the situation is a bit different, their diet habits, and also the living situation is different. In 2013, specialists of sarcopenia in Asia developed diagnosis standard for people in Asia. This is basically following the European guidelines; that means measuring the walking speed and also the hand grip.

Actually, the threshold for the walking speed is the same in Asia and Europe; but however, for the hand grip we have made the criteria for Asian people because the body structure is different between the Asian people and the European people.

Therefore, based on the evidence of the Asian people we have set this criteria for this diagnosis.

To increase the muscle mass there are many factors. Like for instance nutrition and exercise is one and also there is another factor that will decrease the muscle mass; that is, sedentary lifestyle gives an impact, contributes to that.

Here this slide shows a correlation between protein intake and muscle mass. If you look at this, the group which takes less protein losses the muscle mass more. We can say that protein is important to create the muscles.

We are proposing 1.2 gram of protein should be taken per 1 kilogram. But only 27% people get protein requirement.

And here we are also measuring the amount of vitamin D that the people take. And we know that many people lack the intake of vitamin D.

And this slide here shows that the more vitamin D that you take the more muscle mass tend to increase.

Therefore exercise and nutrition is very important.

We have made several groups, one group is only doing the exercise and another group is doing exercise plus checking the nutrition. If you look at this graph, you can see that if you do exercise and together with the consideration for the nutrition, you tend to have more muscle.

As a conclusion, because frailty can be a high-risk condition depending upon individual's long-term care needs status, the basic checklist is an effective assessment tool. And also sarcopenia increased with age and causes ALD and QOL problems in the elderly. It can, however, be reversed if diagnosed earlier and appropriate intervention is provided. And also, it is important in Japan to take a countermeasure for the frailty and sarcopenia.

Thank you very much.

Cervical Disorders in the Aged with Special Reference to Athetoid Cerebral Palsy

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〔**Biography**〕

1984 Graduated from the Graduate School of Medicine, University of Tokyo
1997 Orthopedic Medical Director, National Rehabilitation Center for Persons with Disabilities
1999 Lecturer, University of Tokyo (Department of Orthopedics, University of Tokyo Hospital)
2008 Associate Professor, Department of Orthopedics, Jichi Medical University
2014 Current position

〔**Summary**〕

Intervertebral disk degeneration (cervical spondylosis) that accompanies aging in the cervical vertebrae can occur to anyone. When the spinal cord experiences pressure in the spinal canal due to cervical spondylosis, quadriparesis can occur (cervical spondylotic myelopathy). Cervical spondylotic myelopathy often occurs as a deuteropathy among athetoid or hypertonic cerebral palsy patients due to involuntary movements or muscle tone of the neck. Due to underlying neurological defects and communication problems, diagnosis of cervical spondylosis is protracted, and not identifying before the condition becomes severe is a serious problem. It is important to infer complications as early as possible and conduct MRI imaging. Progress has been made in surgical methods with the use of laminoplasty and internal fracture fixation; however, handling spondylosis with abnormal curvature of the cervical vertebrae and instability remains a difficult challenge. Multiple operations are sometimes necessary due to a breakdown in body parts adjacent to what was fixed.

Cervical Disorders in the Aged with Special Reference to Athetoid Cerebral Palsy

Atsushi Seichi
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Read by Masami Akai, Adviser of Research Institute of NRCD
Professor, International University of Health and Welfare, Graduate School

The reason why the photograph is different for me is as explained. I will be making presentation on behalf of Dr. Seichi. Contrary to the previous talks, this talk is about what happens in disabled people when they get older. I would like to talk about a situation involving diseases that occur in disabled people, especially the athetoid type cerebral palsy, which causes deformation of the cervical area.

I would like to refer to cerebral palsy as CP. Estimating the total number of patients with CP is quite difficult; there are at least several hundred thousand patients in Japan. As for the athetoid type, it is not the major form of CP; however, one out of six, that is about 15% of the patients, have involuntary movement in all CP cases. In such cases, multiple deformations in the neck are observed; and I will show you examples of these using X-ray or MRI images.

Here, you can see the disc degeneration and I would like you to refer to this. If you look at the MRI image, here is the disc and there are olisthesis and bony spurs. And if you can observe this, here on the spinal cord, you can see the compression. This bone degeneration is what we call cervical spondylosis. It is called cervical spondylotic myelopathy when the patients also have some central neurological symptoms. Cervical spondylotic myelopathy is abbreviated as CSM; and today, I would like to mainly talk about this disease.

The cervical problems in CP are (1) instability and (2) premature onset of spondylosis of the cervical spine, which is found in patients with athetoid cerebral palsy.

All of us will have similar symptoms and degenerative deformation with age. But, people with CP experience the symptoms at an early stage. They have these structural abnormalities that appear specifically because of their involuntary movements.

As shown on the slide, not just frequent instability, but also dystonia is seen in athetoid cerebral palsy. Unlike the patients with athetoid CP, healthy individuals would have a long history before experiencing such symptoms; however, as I mentioned earlier, several tens of thousands of patients with CP will be categorized into this type.

But, we do not have enough data and evidence in relation to CSM complicating in CP, and I would like to bring your attention to this issue.

When symptoms appear, they need to be diagnosed. In patients with CP, the diagnosis of CSM is difficult because they already have the neurological symptoms caused by CP. They have several restrictions of activity and continue to develop gradual deformation in cervical areas. Therefore, it is not easy to detect abnormalities and sometimes these symptoms are missed. Because they cannot stay still, it is difficult to control their involuntary movement. Some of the patients have difficulty speaking as well. Therefore, it is very difficult to communicate with the patient to make a diagnosis. In addition, some patients with CP develop depressive syndrome. These are the difficulties in the early diagnosis of CSM.

How can early symptoms be identified in such patients? There are some clinical clues, such as the ones shown on this slide, which could be used. Even with their difficulties, they can use a cane or stick for walking, but sometimes with a deterioration of the gait problems, they tend to fall more often than before. They may have some additional episodes of their symptoms apart from the first one.

Additionally, if they suffer from cervical spine disorders, they would have some muscle wasting called “myelopathic hand,” in the thenar or hypothenar areas. Those patients who are used to going to the toilet every day, may experience some bladder disorders. In a way, they would show clear signs of deformation and change, which need to be detected as early as possible. It would be ideal if early action were taken; however, it does not always happen in CSM.

If the patient starts having communication difficulties, then the family may report that there is something wrong. If they have an advanced palsy (for example, a patient used to driving an electrical wheelchair suddenly cannot drive anymore), it would be discovered as a new episode.

If you are prepared to detect such symptoms using clinical knowledge, the disease will be detected earlier; however, if you were not aware of these, then it would in fact lead to a late discovery.

There is a white spot on the gray area shown in this MRI image; this is what we call the intramedullary high-intensity area. If it is white, then there is a higher water or fluid content; and it means that there are some changes in the spinal cord, which are very hard to restore to the original state.

For treatment, we should utilize our accumulated experience. However, in most cases, previous reports advise against conservative therapy for cervical myelopathy in patients with CP. First, for muscle release, maybe we could cut some of the muscle or use injections for toxin-induced denervation. These interventions could be tried; however,

they do not seem to be effective. These methods do not work well as they do not have a direct effect on the neurological system.

Therefore, the CP patients with CSM are quite challenging cases for spine surgeons. I will show you some images later but the important finding is cervical mal-alignment including kyphosis. Moreover, there are some narrow and sclerotic pedicles. The neck movement during postoperative rest is inevitable because the patients cannot control their own movement.

We considered the surgical treatment but, in fact, it is not a technically ideal situation. You can see the neck horizontally, this is the posterior part, this is the anterior part. Using a special machine, you could actually cut here, get to the gutter, open up to the left and right to enlarge the spinal cord area, and you could fix it with a spacer between the divided spinous process.

And this is how it looks. Therefore, around the spinal canal there is some opening space; however, they had these deformations in this area originally. So usually, we will insert these metallic parts from the back and try to fix their neck.

The fusion type of surgery is what we mainly do. It is not just enough to open up the spinal cord area, so we try to fix it.

I have asked Professor Seichi to show us his follow-up study that has been published in a journal. This is a special report because we did not have many cases. We tried to stabilize the anterior part or to have posterior decompressions, and we also tried to follow up with such patients to know how it holds up in the longer term.

This is the scoring used by the Japanese Association of Orthopedic Surgery and we have been using it as well. Zero means that you cannot actually use your hand or legs at all. If the score goes up, you will get close to normal. Between the ‘normal’ and ‘not being able to move at all’ conditions, there are the serious, moderate, and light cases.

After the surgery, most patients actually receive higher scores, but in many patients, these figures and scores will decrease within a few years. Even though they might be able to maintain a good score for 10 years, their function could actually decline after that period. Additionally, you can see that they will also experience a decline in the function of their lower extremity areas; and it has been summarized in this paper.

Laminoplasty had also been applied; however, in 8 to 13 years follow-up, many patients had recurrence of symptoms and instability. Of these, 4 out of 10 patients underwent reoperation.

We applied surgical treatment, but it was not easy. When it is performed on your neck with these kinds of metallic structures affixed, you can neither flex nor rotate your neck because it has been rigidly fixed. Also, some of the metallic structures could break; the patient might still have involuntary movements resulting in further subluxation.

As I showed earlier, in the spinal cord area, some of the area adjacent to the narrow part also starts showing deformations. As the involuntary movements are maintained, the patients develop pseudo-tumors around the unstable site. This is just below the area of the occipital bone; you would have the pseudo-tumor in the retro-odontoid area. You have to insert the metallic parts again as re-fixation.

It is difficult to provide rest to the operative wound and it does not easily heal because of the constant involuntary movements; sometimes, even the hard metal parts may fail after a certain time. And if we follow up the fixed area over several years, we do not see any gaps being created but we may notice a relapse of cervical myelopathy at an adjacent area, leading to reoperation. So, every time a reoperation is necessary, a broader area is covered. We try to use this type of rigid metal, but using the pedicular screws for cervical instabilities is quite difficult.

First, we have to get the sliced CT image of the neck and try to observe the relationship of the nervous system around the area, to finally create a 3D image using a computer navigation system. Based on this navigation system, we can decide where to actually insert the screws with a high level of safety, but it is not so easy for the patient with CP.

When inserting the screw from behind, there is a problem of miss-targeting (breach rate). So, what I am showing in this image is that this is the inserting edge that you have the screws in. And here it is clear that, although you cannot actually see it, it is quite close to the blood vessel. We have to be sure and careful on how to insert the screws. However, in many cases, it would not work properly; the breach rate is almost 30%. There is a published paper that shows this photograph; it is quite shocking. Here is the spinal cord and the screw has been inserted very close to the spinal cord. I asked Dr. Seichi what had happened to this particular patient.

So, they conducted the study to answer this question. Even with the use of computer guidance and navigation systems, we still have a 43% breach rate. If we actually touch the blood vessels, there will be a massive hemorrhage. When observing the CT image, you will be so surprised that it is in a very narrow area.

Here you can see that the spinal canal has been opened and has enough space, but there is a screw bolted in a very risky area because of the surgery. We had to investigate why this happened.

Patients with CP who have bony deformation, asymmetrical shape of the spine or lateral mass degeneration were described in his paper.

To conclude, from a young age, patients with CP of the athetoid type who are still able to walk have the risk of deterioration of cerebral palsy symptoms. In definition, CP does not advance in terms of symptoms. But, when the patients show a new

symptom such as CSM (cervical spondylotic myelopathy), there is a possibility of developing neural complications.

Surgery is usually prescribed; however, even after the operation, the patients need long-term follow-up. Around 10 years after surgery, they may have a higher risk of relapse so that they might have to undergo the surgery again. As I mentioned before, additional fixing is required in the cervical area using the metal parts and screws, which have a high risk of failure. This is what we are currently noticing. For those patients with CP and their families or friends who might be around, I would like you to know about this problem and to try to observe closely for any minor changes in these patients. Unfortunately, we do not currently have any perfect solution for this disease, so I would like everybody to know that this is the disease course in patients with CP.

I had made the presentation on behalf of Dr. Seichi, I had made the presentation. Thank you very much.

The Status and Problrms in the Aspects of Physical Function and Daily Life of the Elderly with Spinal Cord Injuries
- in terms of physical function and caregiving-

Ohama Makoto

Public Interest Incorporated Association Spinal Injuries Japan, Vice President

Non Profit Organization Japan Spinal Cord Foundation Chairman

〔Biography〕

1969	Yokohama City University Faculty of Commerce, Department of Economics graduate
	Nippon Oil Corporation joined
1980	Cervical spinal cord injury in Nippon Oil Rugby
1995	the National Spinal Cord Injury Association's officers
1999	NPO Japan Spinal Cord Foundation Chairman
2002	Association of the National Spinal Cord Injury Association's Vice President
2004	Social Security Council disabilities Subcommittee
2008	Social Security Council disabilities Subcommittee
2010	People with Disabilities Reform Promotion Committee members
	People with Disabilities Reform Promotion Council General Welfare Committee members
2012	Disabled Persons Policy Committee
2013	Social Security Council disabilities Subcommittee
	Study Group members on the promotion of community life for persons with disabilities
2014	public utility association corporation nationwide spinal cord injuries Federation Deputy Director

〔Summary〕

1. A view of the body function

Following the elderly, reducing the carbohydrate intake and qualities, and try to take lots of vegetables and protein. Hydrate about 1000ml to educing the burden for kidneys.

2. A view of the living (Problems of an elderly person system)

・Long-Term Care Insurance system from the 65-year-old.

・ What cause the troubled when you get long-term care insurance,

・ (Up to 64 years old) system of handicap welfare services . National/Government budget.

Handicapped care system has a rule to give the short and long care time to the person requires to self-reliance.

The concept of self-reliance, need time.

・ (Basic over the age of 65 years old) nursing insurance.Collect the fee from the age 40 years old. According to the rank of 1-5 certification of long-term care need, limit the number of units of national uniform.(Max3 hours / day)

The basic philosophy of elderly welfare and nursing insurance had changed from the basic purpose by the financial difficulties

idea "Old man have been formed in the assets was young. Now that you have brought up children so the service that is not enough care insurance should ask them to care for children or pay the full amount from their own expense savings "

The Status and Problems in the Aspects of Physical Function and Daily Life of the Elderly with Spinal Cord Injuries - in terms of physical function and caregiving-

Makoto Ohama
Vice-president, Spinal Injuries Japan
Chairman, Japan Spinal Cord Foundation

Thank you very much for your introduction. My name is Ohama and thank you very much for giving me this opportunity Dr. Nakamura and everyone who is involved in this international seminar, my heartfelt gratitude to you.

As the screen says, my presentation will be on 'The Status and Problems in the Aspects of Physical Function and Daily Life of the Elderly with Spinal Cord Injuries.' I will be talking about things from the physical function aspect and caregiving aspect.

A little bit of myself. I was a rugby player and nearly 40 years ago I got a spinal cord injury and I have been receiving the visiting care for 24 hours a day. I will be touching upon the system later on. Currently, I represent two organizations. In addition I am a member of Disabled Person's Policy Committee under the Cabinet Office also I am a member staff of one of the Social Security Council under the Ministry of Health, Labour and Welfare.

These are what I refer to, so many publications and books. All these authors are Sumita, Mizuguchi, Horiguchi, Kato, and their publications, their books. And also I refer to the SCIRE Project paper and also the articles that we have used in our magazines and newsletters. I also refer to some data coming from ISCoS which is an International Spinal Cord Society.

This is the ageing model of those with spinal cord injuries. Compared to healthy individuals what is it like? Recently, the life expectancy of patients with spinal cord injury is approaching that of healthy individuals. We still live a little shorter than healthy people but we do see more problems with the somatoform symptoms due to ageing and the number of years elapsed since injury.

Some probable causes here. One thing may be chronic urinary tract infection which is a sort of impact of spinal cord injury. And we may see some secondary complications

associated with spinal cord injury. We also see many cases of degeneration of the joints or soft tissues. Also, in our case we have subjective symptoms that cannot be perceived because of impaired sensory nerves.

This is what we learned from SCIRE, Spinal Cord Injury Rehabilitation Evidence Project. Because of the time, I should be brief. The bullets with the exclamation mark, we have evidence for them. The ones with exclamation marks are the items for which we have evidence. And let me move on.

According to SCI Rehabilitation Evidence, we see that it is proven that our pulmonary capacity or lung capacity has decreased. Also, the bowel dysfunction is also seen. However, when it comes to immune function disorders and thoracic kyphosis, the curvature of thoracic, we still have to find out if there is any correlation between these and our ageing. The same can be said for pain in the arms. Risks specific to women with complete paraplegia due to spinal cord injury is the fracture of the knee; that is also proven.

Further, a little more learning from SCIRE, risks with ageing are lower. Well, the grip reduction particularly in men with complete paraplegia, that is fairly reduced. And as for risks with ageing are similar to those in healthy people and that can be said for continence. But as for ageing phenomena, in the lumbar spine we have to learn more about it.

What about rapid reduction in bone mass? It seems that the level is about the same for those with the spinal cord injury and those who have no injury in the spinal cord.
These are the findings raised by ISCoS, International Spinal Cord Society. This year the assembly or the meeting was held in Maastricht in Netherlands. One of the topics was problems with ageing in patients with spinal cord injury. And we heard that there are many problems with the urogenital system such as hydronephrosis and impaired function of the upper urinary system. I am talking about bladder to kidney, and urethral calculus, stricture, and injury.

Further, we have seen a few cases of bladder cancer caused by long-term use of indwelling catheters. Well, this is no longer a big problem here in Japan but it is still a big problem in other developing countries. What other problems? Regarding nervous system, we have seen a lot of sensory loss and dyskinesia, and carpal tunnel syndrome. We also see cystic lesions of the spinal cord such as syringomyelia.

Further, ISCoS raised or provided some other examples for problems with ageing in patients with spinal cord injury. In terms of musculoskeletal system, we have seen a lot of overuse syndrome of the arms. Well, this is because they are using manual wheelchairs. Also we have seen increased fracture risks and also we have seen increased chronic pain in the back, neck, and shoulders. We also see some problems with skin or integumentary systems such as decubitus which is bedsore, also malignant tumors induced by decubitus such as squamous cell carcinoma, and that is called Marjolin's ulcer.

What about other problems? In the respiratory system we have pneumonia, atelectasis, and we have heart diseases and also urinary tract infection. I would like to let you know that the biggest cause of death among us is pneumonia.

This is a graph about osteoporosis. The white bar is us, people with a spinal cord injury; black is the healthy individuals. From left to right, upper limbs, lower limbs, and trunk and total. You can see that our lower limbs are getting more and more fragile. And it is quite common that a person with a spinal cord injury is very easy to have a bone fracture in the lower limbs.

To prevent osteoporosis, we do these things. Well they are quite common with those who do not have spinal cord injury. We try to take a lot of calcium, 600 milligram per day, and more for woman particularly after menopause. Vitamin D intake is also important and sunbathing and exercise. These are all important.

Furthermore, regarding thromboembolism, cardio vascular disease, bed sore and diabetes, since people with spinal cord injury are at risk for the disease than healthy people, it is necessary to continue exercise regularly.

Next, I would like to talk about long-term care insurance system and welfare services for persons with disabilities. I would like to take this opportunity to talk about what kind of system we have and what kind of welfare policy we have.

Here is the current legal system after convention ratification. Well on the top we have our constitution and under that we have the conventions for persons with disabilities and we have basic Act for persons with disabilities and further we have General Support for Persons with Disabilities Act.

And as you all know, the Article 19 of the convention of the rights of persons with disabilities talks about living independently and being included in the community. It

says, ‘Persons with disabilities have opportunity to choose their place of residence and where and with whom they live on an equal basis with others and are not obliged to live in a particular living arrangement.’

What do I mean by this? This means that we should be able to live wherever we want to. If we want to live alone, we should be able to do that.

Further, Article 19 has this introductory paragraph. It says, ‘State Parties to this Convention recognize the equal right of all persons with disabilities to live in the community, with choices equal to others, and shall take effective and appropriate measures to facilitate and ensure full enjoyment of this right by persons with disabilities, and their full inclusion and participation in the community.’

They say it in writing. I would like to highlight something here. It says ‘on an equal basis with others.’ It is truly a keyword in this convention. No matter if you have disability or not, you should be able to enjoy all the rights on an equal basis.

Now under this convention we now have this law which is the General Support for Persons with Disabilities Act. Based on this law, we are able to ask for home-help service. For example, depending on the persons with disabilities, the municipalities must decide the payment for so and so our service to patients.

But in reality well there is some gap between the public position, public stance, and the reality. For example, if a patient with spinal cord injury requires 16-hour home help a day, it should be recognized. It should be accepted. However, this is only for those who are up to the age limit 65 years old. Once you are over 65 years old, then you have to apply for long-term care insurance.

This is the basic principle of the long-term care insurance system. Well the authorities say that the elderly people must have built up their assets or brought up children during their youth. So, these elderly people who need help should be able to use their savings or maybe they should be able to ask their children to take care of them. Well, of course it depends on nursing care level 3 or 4. But if Mr. A says okay, my disability, I probably will not be worse than now and this long-term care insurance, they think and they believe that this person should be able to work hard in order not to aggravate the disability. However, it is not what is happening and people with disabilities, what is really important is to live as a taxpayer, to be independent. And so,

what the authorities think of persons of disability is quite different from what we want to be actually.

Under the current long-term care insurance system, the most severe level is level 5. And if you are a level 5, then you are eligible to be paid this much for this many hours. This is about equivalent a couple of hours per day times 31 days per month. This might be too much for a person who receives family care; on the contrary, for a person who lives alone it is significantly insufficient.

Currently the allowance must decrease when a person reaches the age of 65 years old. What happens is that it really depends on municipalities. If a municipality is wealthy enough, they can give subsidy or they can provide support and financial grant to those who need help but. But if the municipality is not financially healthy, then you may not be able to ask for it. You may only get long-term insurance system and the rest you may have to pay on your own, that is what is happening currently.

My conclusion is we have a system era or a system problem and this long-term care system will be reviewed the next year or after next year. But think about it, a person with disability does not change after the age 65 years old. I mean, no matter how old we are, we stay as persons with disability no matter how old we are. And in reality, as we age, yes, we can have dementia. We may have additional problems because of ageing. And at that we can maybe ask for free help out of a long-term care insurance.

But it is true that the Japanese government now has financial deficit, financial problems. And currently, it is said that one elderly person is supported by 2.5 young people; but in 20 years one elderly person will be supported by 1.3 persons. Actually in the year 2060 it is going to be really tough. As a system, the current long-term care insurance definitely will have to be revised and reviewed, otherwise it will just collapse as a system. And this is going to be a very big issue not only for disabled people but also for everyone living in Japan and thus I would like to share that with you.

Thank you very much.

Health Promotion in Persons with Mobility Impairment

Toru Ogata

Director, Center of Sports Science and Health Promotion,
National Rehabilitation Center for Persons with
Disabilities (NRCD)

〔**Biography**〕

1995 Graduated from the Graduate School of Medicine, University of Tokyo
2004 Graduate School of Medicine, University of Tokyo
1995 The University of Tokyo Hospital
1997 Department of Orthopedics, Mitsui Memorial Hospital
1998 Tertiary Emergency Medical Center, Tokyo Metropolitan Bokutoh Hospital
2000 JR Tokyo General Hospital
2004 Flow researcher, Research Institute, NRCD
2006 Assistant, Department of Orthopedics, The University of Tokyo Hospital
2007 Senior researcher, Research Institute, NRCD
2009 Director, Department of Rehabilitation for Movement Function, Research Institute, NRCD
2013 Director, Center of Sports Science and Health Promotion, NRCD

〔**Summary**〕

Mobility impairments occur due to a loss in bone, joint, muscle, and/or nerve functioning. In particular, impairments in the trunk and lower limbs cause a reduction in mobility, which also puts an individual at the risk of activity loss. Chronic reduction in activity can further lead to disuse syndrome and obesity, producing a vicious cycle of further mobility impairment that reduces a disabled person's activities of daily living (ADLs). For people with these problems, and who utilize the National Rehabilitation Center for Persons with Disabilities, interventions employ a multifaceted approach that includes medical evaluation, introduction to sports, nutritional guidance, and health counseling. By conducting a risk evaluation from a medical point of view, and selecting a sports regimen appropriate to the individual's level of functioning, individuals can exercise while having fun while also promoting participation in society at large. Meanwhile, improvement and preservation of mobility through interventions for lower limb muscle strength, ambulatory function, and pain control is desired for mobility impairment among the elderly. While preservation of mobility is an important goal for both

disabled and elderly individuals, reports on improving activity levels and links to glycolipid metabolism from recent years suggest it is also desirable to see progress rooted in these assessments. Moreover, during intervention programs, it is important to evaluate an individual's subjective feelings regarding their health using self-reported scales. Given the fact that a determined protocol for subjective assessments has yet to be established, it is important that an appropriate scale be selected and validated.

Health Promotion in Persons with Mobility Impairment

Toru Ogata
Director
Center of Sports Science and Health Promotion,
National Rehabilitation Center for Persons with Disabilities

Good afternoon, sorry I have a sore throat so maybe you might have difficulty hearing me but the title is 'Health Promotion in Persons with Mobility Impairment.'

The major Japanese policy for this health is to extend the healthy lifetime, so that means active life expectancy. So that means not only just simply to extend the life, to stay healthy longer is more important. And therefore to do so if you increase steps by 1500 steps per day, that will contribute to reduce the risk for the metabolic syndrome and low physical capacities. This outcome was led from the various researches with the evidence and therefore if you increase the amount of physical activities, that will contribute to decrease the cancer and lifestyle disease and death. And this is a strong background for the policy in Japan. However, it is very difficult to increase or, always keep the amount of activities. If you look at the inhibitors of mobility impairment. In mobility impairment as an inhibitor, if you look at the people who has injury in the legs or certain other disabilities, for those people disadvantage of physical activities is larger than the advantage of exercising.

These are the mobility impairment directly linked to independence in daily activities. And here you can see, the largest amount is cerebrovascular disease and dementia. You can see that about 20-25% you can see that the mobility impairment is directly affecting the daily activities. That can be seen from the outcome of the cohort research. And we had followed for 4 years. We have followed 3000 people for 4 years and look for the inhibitors. And we have introduced the functional parameters as you can see here. This is chair-stand time, this means we asked them to stand up from the chair 5 times. And we also measured the walking speed. Therefore, we were able to see that stand-up and ambulatory functions decline, the risk of transition to the need for care will increase.

Today, we have provided this proposal from Science Council of Japan, which we made and this is a proposal saying that it is important to keep the motor organ in this extreme ageing societies. It also says that educational activities should be enhanced and also evidence for the examination of the motor organ should be established and implemented. It is also pointed out that the measurement should be performed to prevent health impairment caused by reduced physical activity in persons with impaired motor organs. But although we say the locomotor organs, people are not so familiar with they are. For circulations people are more aware, but, however, for this locomotor organ people are not so aware. The brain will order. The order for the activities will go through the spinal cord and then the peripheral nerve and then also that will be conveyed to the muscles and the cartilage and also to the bone. Therefore, the locomotor organ is the organ that is related to the mobility. There are various causes for the mobility impairment. And one cause is ageing.

Now I would like to divide my presentation to two. And the first is about locomotor organ disorder due to ageing. The major issue we observe is the knee osteoarthritis and the lumbar canal stenosis and osteoporosis.

This is organ document which I got from the Ministry of Health, Labor, and Welfare. And this is how ageing impacts the locomotor organ disorder. A person in a need for support, well that means who is in the most moderate stage of need of care, they will first starting have difficulties in standing up; and then after that as you can see the characteristics items by the level of the need for the care. So, standing up and walking is very important and it is very focused as a starting point in the stage of entering to the need for the care.

If we review how this locomotive function impairment happen is that as you can see some pains and the physiological function disorder will impact the locomotive syndrome. So, having the balance function and the muscles acting properly is very important and having the pain to the lower limb and having also in the lumbar will also affect the locomotives and that will impact too the reduce walking function as well as stand-up functions and that will lead to the locomotive function impairment.

By decrease the cognitive function, that will also lead to the need for care. But however, here in my presentation we are here working on this locomotive function impairment. The reason why we focus more on this locomotive function is that we

wanted the general public to be aware of the importance of the locomotor organ. Therefore, by taking care – well, you can also take personal care and if not then you can also even go to the hospital to extend the amount of the time to have a healthier life.

This shows evaluation of locomotive syndrome, and we first focus on the one-leg standing. This shows the chair-standing test to check the stand-up function, so stand up with either both legs or one leg.

The second is the two-steps test to check the walking function; so that means that first you will take a stride as much as you can, so longer as you can. And also looking at this, the length of 2 steps divided by the height, you can see the value of two steps. The daily activity motion is also evaluated by the self-reporting questionnaire.

Intervention for locomotive syndrome is very important. This is not only the intervention therapy by the hospital, you can also take certain care at your home; for instance, like one leg standing and also the squat. Well, squat helps you to kind of help you to keep standing function as well. And also, the evaluation scale should be unified and background survey subject should be clarified.

It is also to do the validation longitudinal study at the community level. And we are also getting ready to promote that. That was a brief presentation on the mobility impairment based on the ageing.

Next, I would like to move on to the mobility impairment caused by the preexisting disease. The people with disabilities, there is no other common understanding how we define health lifespan of the people with disabilities. We are thinking that function maintenance period according to the degree of impairment and maintaining such period also gives the impact to this healthy life expectancy of persons with disabilities.

This is the questionnaire which we have provided to the people who are visiting our center NRCD. And this is the outcome of the questionnaire. And we asked which items you feel of the ADL you think that you have decrease of? You can see many people have mentioned about the mobility and moving.

In our centers we are also conducting the questionnaire to the patients with chronic spinal cord injuries. We are asking this question to the people with cervical cord injuries and also thoracic and lumbar cord injuries as well.

We have the questionnaires to check their fat accumulation and we have seen. This white bar shows that this is a group of people who are doing exercises and this dark bar

is the people who are not practicing any exercises. By comparing this data, I think you can see that the people who are exercising less have more visceral fat accumulation.

If you look this by the change according to post injury period, you can see the changes here. But especially where you look at the people with cervical cord injury, the people who exercise more have more visceral fat. That means although those people looks like they are exercising a lot and their activity amount is big, well they are having this kind of visceral fat. This is pretty tricky and very difficult area to work on and this is kind of international understanding that we are having.

We have established this Center of Sports Science and Health Promotion at NRCD and we have been taking approaches for the health promotion in various ways. The level of exercise is, as you can see, so first starting with the maintaining activities and there are even people who are aiming for targeting to join the Paralympic.

We are providing program to the people with various types of disabilities, but here quickly we would like to share you what we are providing to the people with spinal cord injuries.

Patients with spinal cord injury, under the consultant of the doctors we provide the program to such a patient. And also, we have the nutrition who is giving the guidance. And first, we will measure the basal metabolism and then we check the content of the meal. This photo here is showing weight measurement and those patients with spinal cord injury, many of them they even do not know how much they weigh. Therefore, for such people they will not be able to measure their weight at home. Therefore, many communities have this kind of device but, however, many people are not aware of that.

This slide here shows the risk management. And the largest risk is the people who have a great change in the blood pressure and also depending on the drugs that will also impact the blood pressure. For the people with lower limb paralysis, people tend to have a bone fracture very easily. So, considering all these risks, it is important for us to introduce the correct program for that person.

People tend to think that people who are using wheelchair would love to use the games played using balls. But however, we still have not got an understanding what might be the optimal game or the activity for those people. At our center we believe that it is better not just to simply play the games. And this is very enjoyable, but

however, many people get tired easily so quickly. So, if you get tired so quickly then you will not be able to do the exercise for a long time; that means that you will not be able to consume calories much.

But still, since you get tired subjectively and you get hungry and you try to eat more, so actually you are obtaining more calorie than you used. So that is the phenomenon that we observe quite often.Therefore at our center we consider games as leisure, so therefore other than playing games, we also provide this kind of endurance exercise as well.

This photo here shows exercise using equipment. And the one at the left shows that by using the upper limb this will also stimulate the lower limb and the center photo shows the passive pedaling and the final third photo shows the vibratory stimulation.

We are providing this exercise and also the nutrition guidance as a set. And rehabilitation center, this program is provided in other three centers. By working together with those other partners we believe that we will be able to kind of do further survey and create the guidance.

This is the feature of the subject. This is the background; therefore, you can see that there are various types of disabilities, high order brain dysfunction and also the visual and hearing impairment as well.

There were no significant changes after three months, and yes we could see some vessel fat. And what is important here is to change the content of the exercise depending on the type of the disability. Well, that is also very important.

There were several outcomes we got. This shows the comparison between the guidance systems by the center by the facilities. We can see that there is some kind of characteristic facility which has strong in medical, some facility is weak in exercise, and in those areas some facility did not have the nutrition. Therefore, it is very difficult to have the public facilities which cover the whole area.

This here shows issues of continuity, the challenges we face. It is very important to continue this exercise. When they started it is important to continue, so better to be in the neibghbourhood. But, however, who will manage the safety and who will work as a trainer? Well, these are the issues and the challenges we still have to consider.

The goal of health promotion in persons with disabilities is that we should not just focus on the figures. We also have to consider the quality of life. Before we

introduce the exercise, there are people and we asked them which activity do you feel your ability has been declined? And before we introduce this program, many people have pointed out their concerns. But after we implemented the program, all the people have answered none.

Therefore, we believe that by promoting the health of the people with disabilities we can also contribute to their social participations. So, after we have intervened to those people's health program, after that they will voluntarily start joining the sports club or the sports team.

There are many advanced technologies around this improvement of locomotive functions. These are the technologies that are developed, aimed to better the life of people with disabilities. However, this kind of development is not done based on the sufficient discussion about what is the purpose of the achievement of walking abilities for people with disabilities. To maintain from the health perspective, yes it is important to keep people be able to walk as much as possible.

This is the summary and my presentation was based in two topics and one is about the locomotor organ disorder due to ageing and another is decreased locomotive function because of locomotor organ disease, this is the existing disease. Therefore, for the people who have disabilities it is important to provide the program based on their type of disabilities and also it is important to manage the safety. By having this kind of approaches we believe that many people will be able to maintain their locomotive function that will lead to the social participation.

Thank you so much.

Discussion

Facilitator Iijima: Thank you very much for introduction. My name is Iijima, the Director of Rehabilitation Services Bureau. So now we would like to have the session for Q&A and the discussion for about an hour. And for the first 40 minutes, we would like to discuss about the common issue in each country among the panel, and then the 20 minutes at the end we would like to entertain the floor for questions and answers.

Today's topic actually varies to a wide scope and it has been discussed from various different perspectives. But one thing in common is that ageing in each country is advancing, so that more number of the disabilities among the elderly have also been increasing. But on the other hand, by ageing of the persons with disabilities there has been the change of needs or the ageing has been accelerated. There are two topics.

And the other thing is that from the biomedical perspective that what kind of changes will be happening and so that we have to do the surgery operation or to maintain the health with using different activities. Or the social insurance system or other ways to maintain the health, how we should tackle and respond to each issues have been discussed.

It is quite difficult to actually summarize all of these things into one to get a conclusion. But, first of all, I would like to ask each presenter on anything that you would like to add on what you have presented or anything you would like emphasize, once again, on what you have shared with us briefly.
So I would like to start from the order of the presentation starting from Pauline.

***Kleinitz*:** Thank you. We have a lot more information about ageing populations and the impact on their health and functioning and less information on the impact of ageing on people with disabilities. I think that it is partly the message,that we need to understand better the effects of ageing on people with disabilities. We often, in these situations, do need to get condition-specific, like the example with cerebral palsy or Down Syndrome,. So it is very interesting and I think it would be good to start to look at these disease groups and understand each one better. But I do think, we increasingly are able to promote the concepts of activity and good health to people with disabilities without it being controversial; health promotion programs that are targeted to people with disabilities and addressing specific issues for their disease or health condition is a way forward. So, in future, apart from broad recommendations of activity and diet, we can also make specific recommendations for people with disabilities with particular disease conditions to support them through the ageing process.

***Facilitator Iijima*:** Thank you very much. So from Pauline, we have heard on the impact of ageing to the society. Further, we would like to learn from you as well and

also we would like to expect you to have wider variety of the activities and you have shared those with us today. Now, we would like to ask Dr. Lee to give us any additional comment.

***Lee*:** Thank you. As I said, Korea is maybe the fastest ageing country in the world now. The ageing itself of course is a big challenge but more importantly ageing is going too fast in Korea so we do not have enough time to adjust to ageing society.

Maybe Japan has many experiences about ageing society but the speed is much faster in Korea. So, we need to prepare for it. But in policy-making and other systems, Korea is a little confusing right now. For example, the government departments responsible for the ageing and disability are separated and do not know how to work together. I think we need to make some kind of interdepartmental organization to make better and efficient system to solve this problem. One more problem is that the life expectancy is increasing fast but the health age is not. It means that for the last 5 to 10 years of life, most of the people depend on the hospital care and spending medical cost too much, so we need to solve this problem too.

So, rehabilitation may be one of the solutions for this problem. We need to make people live in a healthy condition as long as possible. Those are very important problems I guess. Thank you.

***Facilitator Iijima*:** Thank you very much. In Japan, perhaps it is the most advanced ageing society and it has been the fastest in the history; however, in Korea, more than Japan, you will be getting into the ageing society in the faster speed. So, in that perspective perhaps you are facing to a difficult issue. And it is exactly the same in Japan but there are economic issues related to the healthcare system and how we should be supporting those is something that we are facing and as well as in Korea. Thank you very much.

***Chen* :** Thank you very much. In case of China, as I said in my presentation, we also are in an ageing society. Our country is ageing as well but not as significant as in Japan. So, I think that we can learn a lot from your experience in Japan and that we would like to apply to our case in China. About 25 years ago, I came to NRCD, this here center as a JICA trainee, a trainee doctor. And really my experience here became the basis of what I do now, so in that regard I will like to thank you all very much.

***Facilitator Iijima*:** Thank you. Dr. Chen, in your presentation you talked about the current status about elderly stroke patients in China and you said that stroke is the

number one cause of death in China. In 1950s and 1980s, so over those 30 years it was the case in Japan too. Now, stroke is number four cause of death, but the prevalence of this particular disease is quite high. Compared to heart diseases, compared to cancer patients, still far more people, far more patients are coming to hospital for treatment for stroke. So it still remains as a significant, very important big disease. And earlier you said that in the very near future you will have 100 million people who are over 80 years old. I mean, that was striking. Well, thinking of your huge population, well, the population of the very senior people, 80 years or older, will be even larger, far larger than in Japan. So, it is quite noteworthy. Thank you very much. Now, Dr. Arai from Kyoto University.

***Arai*:** Actually I had been working on geriatrics so therefore I was focusing more on the people without disabilities. However, listening to what Mr. Ohama has said, it was pretty shocking to me. It is strange for me that elderly persons with disabilities should use long-term care insurance. Since because of the time limit, I think I may try to speak fast so I was not able to explain well. But listening to other presenters' presentations, and this ageing society is a global issue and Japan is number one, and Korea and Taiwan are progressing ageing society with a great force. And next, China and the Southeast Asian countries as well as India are also a very big country for ageing – heading for the ageing societies.

Therefore, what is important for us to have a stronger collaboration and to share information so that those Asian countries, so that we will be able to tackle with the issues that we face due to the ageing society.

We are having communication, taking communication and collaborating at the society level; but however, I think we should expand the collaborations among governments. Today, I have presented about the frailty and sarcopenia but metabolism and locomotive syndrome is also more using the general term. And I thought that the three letters in Japanese were locomo or metabo might be easier for, kind of, people to understand. And frail is more translated into the vulnerability or the weakness in the Japanese word; however, I think that is not properly communicating the meaning of the concept of the world frailty, and it gives more negative imagine. So that is why I decided to use the word frail in Japanese as well. I was targeting to make this in three Japanese letters; however, frail in Japanese if we write, we use four letters. But I hope that this will give the better understanding more so that the people will be familiar to it. Today, I mentioned about the nutrition, about the lack of protein will impact the decrease in the muscular mass amount.

Therefore, it is important to educate young people to prevent the sarcopenia or the

frailty. And I truly believe so, so I want to. I think it is important for us to educate that to decrease the number of the elderly people with signs of frailty.

We would like to kind of switch that in the trend to decrease because metabolic basal syndrome before such people was increasing but we were able to reverse the trend. I know that since we are facing people ages and we are facing the ageing society, so we know that it is very difficult. However, I hope that we will be able to, kind of, reduce the number of the people with frailty. It is important for us to extend the number of the healthy life expectancy and I think that is our important mission. Thank you.

***Facilitator Iijima*:** Thank you so much. Well, in the field of gerontology, Dr. Arai is truly an expert of sarcopenia and frailty and I think that he did share with us the direction that we should go for. Now, Dr. Akai.

***Akai*:** Actually, I had done my presentation on behalf of Dr. Seichi, so I should not discuss too much in detail about CP. I had been mainly taking care of the patients with spinal cord injury. And as I mentioned earlier, I experienced some cases of paraplegics, who developed urinary retention after self-catheterization over several decades and had to convert it to cystostomy after all. I also have several patients in every year, who sustained from the fracture of lower leg and then hospitalized when falling between the wheelchair and bed. So, they may be able to go back to their social life but they could not get to the complete cure without risk.

Also as for the bedsore of spinal cord injury patients, we cannot resolve this complication at all. We cannot get rid of the bedsore even after backing to their social life, and some patients would have high fevers and visit acute admission. So, as the secondary disorders or any type of complications, we still have lots of heavy burden for disables. There are various different ways of approaches to the patients by medical staff. However, before that, we have to modify their lifestyle to follow good medical management (the matter of “adherence”, previously called as “compliance”).

But just as not a few diabetic patients are living as a self-destructive lifestyle, some people may repeat such episode several times. That is a situation we cannot avoid as a reality.

As cerebral palsy patients cannot detect early symptoms by themselves, the people around the patients should keep close eye on it and should select the appropriate method to take good care. But sometimes they have neither a good relationship with their family nor with the caregivers. So it is easy to say but difficult to do. That is my additional comment. Thank you very much.

***Facilitator Iijima*:** Today, there has been the topic about issues related to diseases along with ageing and we had a topic on CSM, the Cervical Spondylotic Myelopathy. And in the other cases as well, they can actually walk by themselves when they are young but after a later stage they have some secondary disabilities. So the people with disabilities, we need to give them the medical care or management continuously for life long. Thank you very much.
Now, Mr. Ohama.

***Ohama*:** Okay. Thank you. Well, today, I talked about ageing but at the same time I wanted to share with you something about regenerative medicine. And this will be of quite importance. Using iPS cells, in 3 years' time it will be tried on acute spinal cord injury and then iPS cells will be tried on the chronic spinal cord injury. And we also hear that treatment for acute stage spinal cord injury using HGF is in late Phase 2. This is quite evangelist and we now hear that there is a chance or opportunity for us to dream of ALS, spinal cord injury, maybe CP to be cured, to be treated.

In the future, the diseases which we were told that are refractive, I mean there is possibility to improve QOL of such people by regenerative medicine in the future. And I think that there is a light of hope that we should hold.

As far as prevention is concerned, decubitus is really important. That is quite an issue. And our hope is to have echo testing at hospital as much as possible. Particularly those who do exercise, I think that there should be an echogram testing conducted particularly after doing exercise so that we can see if there is any decubitus or not and I will strongly ask for that.

***Facilitator Iijima*:** Thank you. Today, Mr. Ohama spoke to us as a very person with spinal cord injury and I appreciate your sharing with us the very issues about those with spinal cord injury. You also mentioned about issues and problems with our current long-term care insurance and general support for Persons with Disability Act. And further, in this particular panel discussion, you just shared that you have hopes of using iPS cells. Thank you.

***Ogata*:** Today, my presentation was based on about the mobility impairment due to ageing and then also about how that will also impact the people with disabilities as well. And what is common here is that early detection and early intervention is important. I think that will be the base fundamental. And what I wanted to highlight is that locomotor organ, you have to really take good care for the maintenance and, well, that is important. And if you get injury, yes everyone does understand that; but however, if

not, this degradation of the locomotor organ gradually progress. Therefore, before you were able to walk quickly, but however you will not be able to do and then you have to take a rest afterwards. Like, for instance, for the people who are wheelchair users, they were able to transfer easily before; however, as you age, you will have more difficulty on the transference. Therefore, unless you get aware of your changes, you will not cure this mobility impairment in the more difficult stage. So, therefore, I think it is important to have a system to do regular checkups so that to check these motor organs.

And also that people with disabilities, how they will be able to get the medical checkup regularly. I also mentioned about weight measurement of the people with disabilities and that will be also another big issue. And for some medical checkups, we even have not come up with the idea how we can actually do that, provide that to people with disabilities.

***Facilitator Iijima*:** Thank you very much, Dr. Ogata. Dr. Ogata had presented about the locomotive syndrome and about the impact to the general people of the problem they face by ageing. And Dr. Ogata also mentioned about the impact of ageing to the people with disabilities and how to maintain their health. Thank you very much.

Now, we would like to move on to discussion. To begin with, well, in East Asia or in the Asian Pacific region, in the Pacific region, well, this ageing society is increasing and expanding in a very rapid speed. So, how we can deal with the issue of the ageing society and the issues raised by those societies? Does anyone have comments specifically on this? Well, the number of elderly people with disabilities, the :

***Lee* :** Most important is to make people in a healthy condition as long as possible. We need to expand the healthy age, in other words, healthy life expectancy. It needs maybe many medical research and other rehabilitation programs. But at the same time we need to prepare for the welfare systems and other societal background to help the aged people.

We cannot make people live shorter. Anyway, we can live longer than now and in the future and the new generation maybe will live longer. So all we can do is to make the society more suitable for the aged people and make the elderly people healthier and live more in healthy conditions. I think that is the point but at the same time, of course, it is not easy. It will not be easy at all.

***Facilitator Iijima*:** Even though we age ourselves, we should maintain our health and we need to be independently healthy living as long as we live. Today, for the locomotive

syndrome in Japan or frailty or sarcopenia, there were some activities made, but in Korea do you also have such specific program or incentive to maintain the health or any policy?

***Lee*:** Korean people are getting more interested in maintaining health. They want to live healthier and they do exercise themselves more and are trying to eat better food, healthy food. And the local and central governments are making some exercise and health promotion and maintenance program for the people. In most of the local offices, there are some small gyms or small societal facilities to make people do more exercise, get together, exchange opinions and talk to each other.

But still, as I said in my presentation, the survey showed that the elderly people have more health problems, meaning that they are not in a good health conditions, even though they have better lifestyles than the middle aged or younger people do. Because the ageing itself makes some chronic conditions and disabilities, we need to make some more effort to prevent chronic diseases and disabilities.

Right now, we are just beginning to do such kind of things. In the future, I think we can make more progress.

***Arai*:** I think one key is nutrition. Of course not only to the general elderly people, even for the people with disabilities, the amount of the physical activity decrease so therefore they tend to gain weight. Therefore, what is important is what we should do is nutrition of those people. And pneumonia, infection and bedsore which Prof. Akai mentioned are also another important issue. Therefore, how we should deal with those is another point.

***Kleinitz*:** Thank you. That is not an question. Of course, vaccinations or immunization is one of the most cost effective public health interventions we have for a range of different conditions and diseases. On the whole, we are encourageing governments to expand their immunization programs and most governments have in recent decades, including many low income countries. But we understand very well that there is a cost to immunization programs and governments will make difficult choices based on good data, at least that is what we hope and recommend. On the whole, yes, we should move towards expanding vaccinations but, there is a cost benefit analysis that every country should undertake.

I would like to also comment on health promotion. I fully agree that within health, health promotion is often not well-resourced. And when we compare what we spend on treatment and management, we really need to be smart and see that health

promotion is an investment that often reaps benefits decades later. In a lot of countries, WHO has worked to help governments identify funding streams for health promotion. And one of the successful approaches has been directly using taxes from tobacco or alcohol to fund health promotion schemes and, obviously, taxing is very effective in reducing consumption as well, particularly for tobacco, alcohol, and even potentially other foods that are not healthy.

I do think in relation to health promotion, particularly regarding diets, we have to focus more on multisectoral approaches. Because in a lot of countries, if you look at the Pacific for example, trade policies and importation of cheap unhealthy foods and drinks, is impacting negatively on health, and working with government agencies responsible for trade is an important intervention to address this issue. .

So, in the area of health and health promotion, it is more complex than it used to be and there is a need for multisectoral approaches. When we are talking about food and alcohol and soft drinks etc, there are large corporations pushing these products and making profits. There is a complexity that is well recognized and we have to work to address this.

I do think when it comes to physical activity, there are no corporations saying do not do that – like the tobacco industry that pushes tobacco.. So in some ways, increasing activity levels should be more straightforward and the fact that it is important through your life is something we can promote more and more. Thank you.

***Facilitator Iijima*:** Thank you so much. And, well, this should be kind of multisectoral and also we should approach various age groups to provide this kind of health education. Starting from that discussion, the key is the nutrition. And if we say metabolic syndrome, many people are considered about taking too much nutrition; however, the more you get older then poor nutrition becomes more of the issue.

Therefore, if we are to implement the health, especially in the Asian countries they are advancing rapidly and many foods from United States, so the advanced countries are rushing in to such countries. Therefore, there is some kind of complication there. However, for the physical activities, well, there is no one to stop that and that was the point being made.

Dr. Arai also mentioned about the vaccine and we know that it helps to overcome various illnesses. And now we are suffering from Ebola and I think we have to think about what are the current issues we are facing. For the elderly people, the pneumococcal vaccine is also very important for them to take and we believe that it is meaningful for us too, we will consider introduce about this vaccine. However, how we can kind of introduce that and how we can support that is one discussion that we

have to consider.

Further, some more detailed issues or specific issues like stroke or maybe driving rehabilitation for individuals. I mean so many different topics were covered earlier. Dr. Chen, to prevent stroke, do you have anything else you can share with us to prevent stroke?

***Chen*:** I would like to say a bit about health maintenance, keeping health. Fast food is loved by kids particularly. In China too, we have an increasing number of fat, obese children. We do have a lot of commercials on fast food and junk food and it can be very difficult to educate children. To promote health, that is taken into serious consideration and many people do consider that exercise is important and Tai-chi used to be far more popular than now. But now, we see more people enjoying dancing. Those who are close to retiring age or retirement age, I mean, we see a lot of adults dancing in plazas and they play real loud music. And this loud music and their crazy dancing can be bothering for the residents in the neighborhood but that is one thing that is happening.

In addition, in China, we have bad, bad traffic jams and traffic rush hours. And because the traffic jam is so terrible, I know that in peak time drivers get off the cars and they started dancing instead of just waiting.

***Facilitator Iijima*:** Thank you. Tai chi is said to be really good for your health and the Japanese people are learning to do Tai chi more. But it may be different in China.
Dr. Lee, anything else about driving.

***Lee*:** Yes. Actually, there was a car accident early in this year. A taxi collided into the front door of the Hotel Shilla, one of the finest hotels in Korea. It is a big and expensive hotel. The driver was 82 years old. We are not quite sure if the ageing is related to that accident, but recently statistics showed that commercial car drivers make more accidents than before because of their ageing and we need to prepare for the elderly to drive safely.

I introduced the CPAD program. It was originally designed for the brain impairment patients. It was 10 years ago. At that time, we did not expect these kinds of conditions. And then right now the senior driving is a big issue socially so I introduced that program to test the cognitive function of the elderly drivers. It is not obligatory yet, but anyway, the elderly drivers can take the test if they want. We can warn them what they should be careful about and they should know they are ageing. Because most of commercial car drivers and other elderly drivers usually do not know

they are losing functions. They think they can drive as before, but by the test they can realize that there may be some problems, so we can educate them to drive safely.

***Facilitator Iijima*:** Thank you very much. In terms of thinking about the independency of the elderly people, we would like them to keep driving in safer way as long as possible; however, we have more number of the dementia and there will be an accident made by the elderly driver. In Japan, actually when you renew your driving license when you are 75 years old, you have to take the exam to check on your cognition. I am sorry. My time allocation is not very good so we are actually running out of time. However, for the people with disabilities when they are ageing, I am sure that there are many issues and problems arising. So, once again, from Mr. Ohama, I would like to ask for your opinion that in the future, some of the issues related to the ageing of the people with disabilities, what kind of measures are needed?

Ohama: Thank you. Chairperson of the National Spinal Cord Injury Association is Mr. Mugiya. He is 73 years old. And, well, it is not only among people with disability but the same can be said for even people with and without disability. And as long as they can contribute to society, to all these groups, I think that it is really good for them. This guy, I mean the Chair of National Spinal Cord Injury Association, if he is asked to retire, I think that he will lose something really important for his life.

We all need something to live for. It can be work, it can be some contribution to the society. Like Dr. Nakauchi of University of Tokyo, well, he retired and then he went to the States to work at Stanford University. It is not just age. Even if you are 65 years old but if you still can work, go ahead and go right ahead and work, keep working. And I think that there should be a system or there should be an environment to enable us to keep working if we want to and it is not only for people with and without disabilities but for everyone.

***Facilitator Iijima*:** Thank you. Importance of keeping up with some work, you say that it is really important not only for persons with disabilities but for every one of us. This is quite insightful. As long as we are able, as long as we can manage, yes, I think we should be able to choose whether we want to keep working or not. And that is quite a big issue I think and that is quite a big common issue for all of us. Now, in the next part of the session, we would like to accept some questions from the floor. Mr. Inoue.

***Inoue*:** My name is Inoue. I work here at NRCD. Working reminds me of something, so I would like to share with you something and I would like to ask the speakers a bit, a

question. Among all the issues for senior citizens, we talk about time sharing. But by that I am talking about senior citizens, I mean the people who are after retirement but who could still contribute while spending a bit of their time. And the same is also talked about among farmers, universal agriculture that is called. There are many, many issues and hot topics that we hear about elderly involved in the community, in the society. Now, when it comes to people with disabilities, when they are old, what can we say? Well, I do know a couple of people who have disabilities and who work at companies. But does anybody know if this person can still keep working after retirement. I mean, does anybody have any knowledge about it, information about it?

***Facilitator Iijima*:** Anybody? Maybe Ohama-san? Mr. Ohama?

***Ohama*:** There are some persons with disabilities who can keep working even after retirement, but that is really limited. But if we do have such options, that would be quite motivating. And not only work, but if they are playing sports, if they are enjoying sports, I do hope that they will continue playing that as long as they can. And so really there is so much overlapping among disability issues and ageing issues and there are so many issues that we have to overcome. There are many issues toward create inclusive society for both people with and without disabilities. And making things universal, I mean that sounds good but we really have to analyze whether it is really functioning for us. If we need to make everything universal, I mean this could make things complicated for employers and people and I think that we could maybe raise such topics more actively, maybe writing books or writing articles or whatever.

But really, I mean, not only for disabled people but also for every one of us it is quite important to have something to motivate us. Thank you.

***Inoue*:** Thank you.

***Facilitator Iijima*:** Thank you so much. Any other questions or comments? Please.

***Hattori*:** I am Hattori from University of Human Environment. Listening to Dr. Ogata's presentation I am pleased that paradigm of sports rehabilitation has been changed to a good direction. As a person who knows the old practice of the center, Dr. Ogata and his staff made so many efforts for the improvement of the program. I am proud of the staff who put the efforts. Since Dr. Nakamura is here, I would like to say that staffs of the center would make another paradigm shift in other fields of rehabilitation. I am convinced that younger staff will make further improvements which we were not able to

accomplish.

***Facilitator Iijima*:** Dr. Ogata, do you have anything?

***Ogata*:** It is a bit difficult for me to ask elderly people to get retired. But, well, we have 36 years of the history in the Rehabilitation Center and we have accumulated the knowledge, so combining this knowledge and the young power is important. Also, how much can we work with the external factors or external companies or the organizations? So, working with the people from outside I think is important. Actually, in current health promotion program, we work together with under the support and collaboration with the work staff at other facilities as well. Therefore, I think those are the very important attempt.

***Facilitator Iijima*:** Thank you very much. Are you considering international collaboration like collaborating with your Chinese friend or Korean friend?

***Ogata*:** Yes. I visit Korea and China quite a lot and we have similar lifestyle and our body structure is pretty much the same, so I think we can introduce a similar standard. As for sarcopenia, it has an Asian standard or Asian criteria. Therefore, I think we can work together and that is important. I would like to ask a question to Dr. Lee. What do you think about robotics? How can we introduce robot technology in our field? And in Japan and in Korea, I think the market is very small so I think it is important to sell the robot in single markets, so how do you think that we can utilize a robot in Asian market. Do you have any idea how the robot can contribute to this field?

***Lee*:** About robotics, I think there are two kinds. One is to treat disabled people and the other is to just help them in ordinary life such as an environment control. The robotics may be one of the solutions in the future but still in the research basis. It costs too much. Cost is the biggest problem. It costs too much to buy and too much to make. Actually, the Korean government is very interested in the robotics industry so we have programs for translational research for rehab robots. Dr. Song Won-Kyung knows better than I do.

We are now doing some translational research. The basic purpose is to make the makers and users get together, because makers and users may have different ideas. Makers say that they make robotics for the users, but users may not like it. So we need to solve that problem. And the next problem is that it is too expensive to be utilized in the society. So, we have another program to supply the robotics to societies called business support program.

It is supported by the government budget. Our government buys the robots and supply to the users. It is very limited to small number of robots, but anyway, they make better and cheaper robotics to be utilized in society. Those two programs will make robotics more available and better in the future I guess. I expect so.

***Facilitator Iijima*:** Thank you very much. The robotics in the future has a great expectation. However, still there are some difficulties in order to be introduced and applied in the society. One thing is about the cost. And, as Dr. Ogata mentioned that perhaps we should have a core development with different countries or some kind of collaboration will be needed. Any other question from the floor?

***Ikeda*:** Thank you very much. My name is Ikeda, and I am a design engineer. It is very important that the elderly work even if they have disability. However, ensuring the integrity of such work is a problem. Elevator maintenance can be seen here as an example; once the elevator exceeds its service life, it has to undergo maintenance at regular intervals, and a system is established to check if it can be more frequently used (integrity checks). Dr. Lee has created a system for checking the integrity of drivers called CPAD. Insurance companies are a part of this excellent system; their participation results in cheaper insurance premium costs, thereby providing incentives for the elderly and others who wish to work and ensuring the integrity of their work. Many plans in the United States use this type of insurance. People wish to continue working as long as they can to improve their QOL(quality of life) irrespective of ageing, and a system for ensuring quality of works of the elderly workers is necessary. I request you to provide your opinions on this issue and the global trends in this regard.

***Facilitator Iijima*:** Do you have any opinion? Any case in Korea? In order to keep working, you need to make sure that you can keep your integrity or safety or you should be confident that you can continue to work and you have to confirm that within yourself. In order to do so, perhaps you need to have a certain kind of incentive and it might be 5% discount on insurance policy that you mentioned. And I think it is a great way to confirm but is there any other mechanism that you can think about or you know about?

***Lee*:** That is a tough question. The 5% discount, it might be an incentive that may be more effective for the insurance companies because with the accidents going down, the insurance companies can make more money. Also for the drivers it may be a very good incentive. But other example, I am not sure yet. I am not sure right now.

***Facilitator Iijima*:** Thank you very much. In Japan, for the locomotive syndrome you need to have a self-judgment or you should actually get evaluation test to check or maybe for the metabolic syndrome checkup as well. But the persons themselves should realize on their own situation. And it has been mentioned earlier. But when you want to renew your driver's license after you became 75 years old, you have to actually check on your cognitive function. But for the first time maybe that they realize that their cognitive function had been declined. Perhaps in Japan we already have those kinds of activities; however, in order to make it more effective perhaps we need to work on this.

Ikeda: Here is another instance. As I understand, in Germany, a system has been established to attend to people who suffer from a physical disability due to an injury. A doctor provides a prescription for exercising, and the patient can then regularly visit a facility to exercise. The doctor specifically instructs the patient to adhere to the exercise prescription. An occupational therapist (OT) and a physical therapist (PT) are involved in this treatment, which means that the service industry is responsibly involved to ensure the integrity of the patient (exercise also has an important function in terms of social participation, which helps prevent or slow the progress of elderly dementia).

Medical care in Japan is dependent upon drugs in many cases, but including exercise in a patient's prescription results in a more comprehensive effectiveness of the treatment and ensures the patient's integrity. When a prescription for drugs is provided, the patient engages in a one-way treatment approach of simply taking the drugs, and if the patient does not undergo a follow-up examination, it is impossible to tell whether the drugs cured the disease, the prescription was effective, or the patient has integrity. However, if the patient engages in exercising, the patient's kinetic behavior can be placed under the expert observation of a PT and an OT, or measured using a mechanical device. Such a system allows for the provision of feedback on the patient's health status. The provision of short-term feedback regarding the treatment and prescription leads to improvement in the cost-effectiveness of medical care and a faster diagnosis. The theme here is "Motor dysfunction in the elderly: Disabilities of the elderly and the ageing of disabled persons" and is mainly concerned with the passive aspects of exercising. Since we discussed the example from Germany, Ms. Kleinitz, I request a representative from the WHO to speak about initiatives similar to those in Germany and other countries that are attentive to the proactive aspects of exercising and incorporate exercising in medical prescriptions.

***Facilitator Iijima*:** This is the situation in Germany but, Pauline, do you have any comments on that?

***Kleinitz*:** I mean, incentive schemes are important and they do work. And when it comes to any sort of policy implementation, there is the carrot and the stick. And so, we often need both to have a better intervention. And I think in a range of health areas, we could use them more than what we actually do to get better health outcomes because there is y an economic benefit overall for governments to have that approach. I mean, return to work schemes are often put forward as cost - effective. When it comes to rehabilitation, we can talk about rehabilitation being an investment, that it is a good financial investment and the evidence is strongest with the return to work schemes where they economically modeled what interventions and therapy costs and returns on this in terms of productivity. So the investment to get people back in work, the investment case has been made. Thank you.

***Facilitator Iijima*:** In Japan, we are not sure where the person is injured, whether the doctor will prescribe to do the exercise; but however, we provide rehabilitation and the rehabilitation is provided also under the long-term care system. Therefore, the patient is recommended to do the exercise by themselves more. Mr. Ogata please.

***Ogata*:** I have additional comments. Using the long-term care insurance, I think that under that insurance many programs are provided together with exercise and rehabilitation. Well, not all the centers or the facilities are providing the same quality because some centers, they have good equipment but some centers do not. Therefore, how we can level those differences is our next challenge. I think it is important that providing a good service then that they can have better charge. So, those kinds of comprehensive support act should also support the people receiving such quality service as well.

***Facilitator Iijima*:** OK. Dr. Arai, do you have anything ?

***Arai* :** I have nothing to say more.

***Facilitator Iijima*:** Any other question? Okay. Please.

***Taguchi*:** I have a question to Dr. Arai. Well, there is no better therapy or treatment than prevention is what I believe, and I am working in this field 50 years. And, yes, there are five check items you have mentioned about the grip strengths and the walking speed. However, how are you measuring the muscle mass and the muscle strength? Because I want to know what correlation they have with the age groups. Because for

the people with disabilities, like 5 centimeters and 10 centimeters and when they were relaxed and when there was tension, I think that has a very big difference. You have said that measuring the kind of muscle with the fat is not so meaningful, so I just would like to ask about that process.

***Arai*:** Actually, what I have said is that you will measure outer perimeter of the upper arms and legs. By doing so, we measure the muscle amount. And there are DXA to measure the amount of bone and bioimpedance, using the impedance we measure the amount of the fat, so there are several ways. But ideally, it is better to use MRI and CT I would use those kinds of equipment. But taking the data of the muscle and getting that outcome is important. Because with the kind of the vertical research, it is very difficult for us to kind of just get a correct proper outcome.

Well, when we do this measurement of the muscle mass, actually we can get a good outcome from the men but not very much from women, so it looks like women have difficulty in keeping the muscle mass.

***Okura*:** My name is Okura. I come from Tsukuba University. Thank you all very much for valuable presentations. I think that we had learned a lot of keywords from all the other presentations. Geriatric exercise and locomotive syndrome and all these are what I actually train and what I actually teach. They seem to be acceptable for students. And I am a teacher, I teach at this university and I find that my students find it difficult to understand what sarcopenia is and what frailty is.

And as far as I can tell, there are so many different names and terms, particularly for senior or elderly patients or people. Do you think that it is possible for you to make all the words and terms consistent? Because even young students find it difficult to understand all these terms and words. Sometimes it can be quite confusing for us, who teach students. Here, we are talking about elderly people, elderly patients, or elderly handicapped people who really need help.

***Arai*:** That is quite an important opinion. Last month, we had a gathering. We had a meeting among experts of sarcopenia and frailty and everyone in that meeting did recognize the need or necessity of having consistent wording. Cachexia, Sarcopenia, osteoporosis, frailty; I mean it is a broader concept so we do recognize the importance of having easy to understand words and names. Thank you.

***Okura*:** One last thing to Dr. Ogata, if I may ask you. It is about locomotive syndrome evaluation test. You have a two-step test and evaluation test and standing up test. In

reality, I deal with a lot of people with frailty and most of them cannot really make it in this testing. I hope that you can come up with maybe a more effective or more workable evaluation criteria for these patients.

***Ogata*:** Thank you for your comment. When it comes to two-step test, yes I understand, making two big steps can be a little scary for many patients. I understand that. And one thing about locomotive syndrome is targeting a wide range of people, fairly young, like those in 40s and those in 80s. The two-step test cannot be really conducted. I think that you can say that that patient or that person is not able. You could take other measurement to see his or her walking capability. But, at least this two-step test can be one criterion you can refer to and you can make your judgment seeing this patient whether he can really manage it or not with the two-step test. Okay. Thank you.

Facilitator Iijima: Thank you all very much. I am sure that you have more and more questions but we have the time constraint and we are behind the schedule a little bit. So I would like to close this panel discussion. It is really difficult to summarize all we discussed. But going back to Pauline's presentation, she mentioned that there are only two types of people: who have disabilities, and who do not have disabilities yet at the moment. In fact, disabilities can be a problem for anybody.

Everyone is related or everyone has association with disabilities. Anybody can have a disability and I think that it leads to a changing view towards persons with disabilities. At the same time, well, ageing has become quite an issue, particularly in Eastern Asian countries. But it is also a common issue in all countries in the world. So the cooperation or collaboration on the global level is extremely important and necessary.

In that regard, I think I am very glad that we had quite a fruitful productive exchange of opinions and thoughts and I sincerely hope that this discussion and this forum will be a contribution to all of your work in the future. And I also would like to thank the audience for your contribution and for your participation. With this, thank you very much and I would like to conclude this panel discussion.

Closing Address

Setsu Iijima
Director
Rehabilitation Services Bureau,
National Rehabilitation Center for Persons with Disabilities

Thank you very much for participating to the international seminar on actual status and issues facing older persons with mobility impairment. Thank you very much for the presenters and also those who have participated as an audience. As it has been mentioned repeatedly, we cannot avoid the issue of the ageing in the East Asian region. This is going to be one of the most important issue. In order to deal with this issue, as National Rehabilitation Center for Persons with Disabilities, we would like to continue on holding this type of international seminars in the future.

So we would like to ask for your continued support. Thank you very much for coming all the way through. With this, we would like to close officially on this international seminar. Thank you very much.