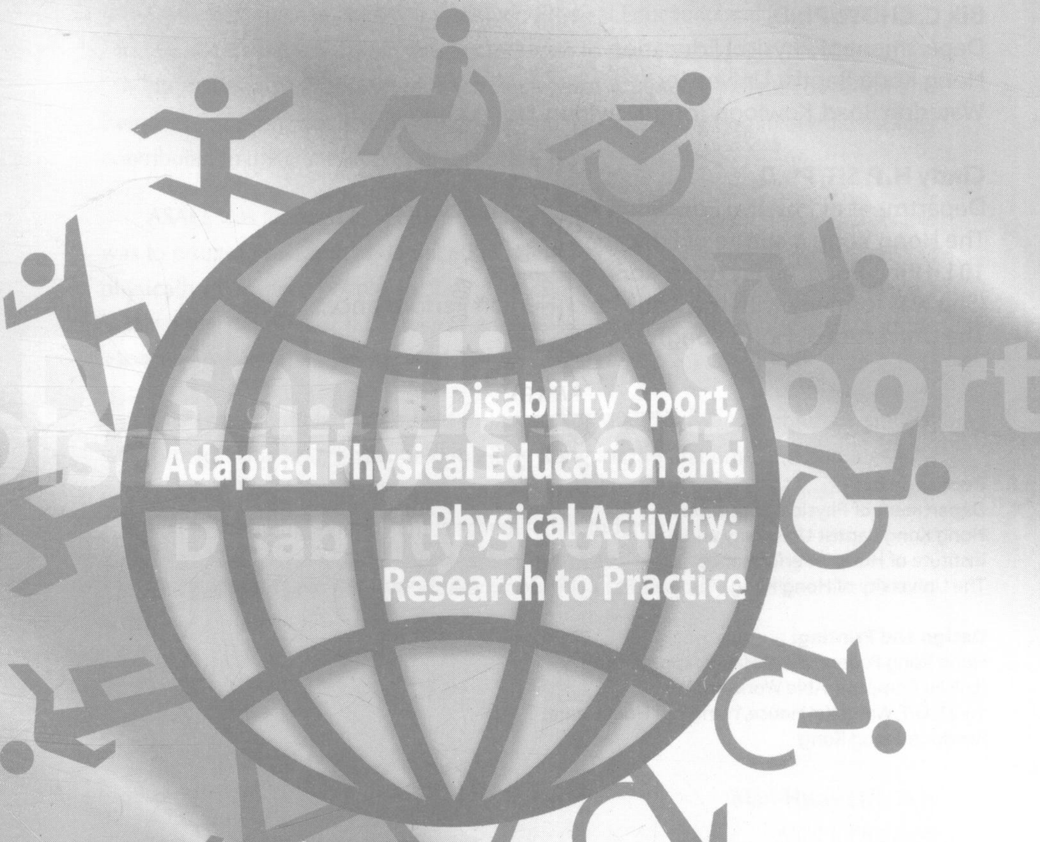
The 7th International Symposium of Asian Society for Adapted Physical Education and Exercise HONG KONG 2002



Disability Sport, Adapted Physical Education and Physical Activity: Research to Practice

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FOREWORD

On behalf of Asian Society for Adapted Physical Education and Exercise (ASAPE), I would like to express my sincere appreciation to the Organizing Committee of the 7th International Symposium of Asian Society for Adapted Physical Education and Exercise. This event was held in Hong Kong and the Organizing Committee has strongly contributed to the great success of this event.

ASAPE was founded in Seoul in 1986 with two main purposes. The first objective was to promote research and education related to the health and physical fitness of physically challenged people, including the elderly. The second aim was to provide a better understanding of the physical abilities of the physically challenged, and the society in general, through physical activity and sports.

This symposium has been held in Japan, Korea and Taiwan bi-annually since it was formed. This year, it was held in Hong Kong for the first time and had a significantly shown how has ASAPE grown and expanded in Asian countries over the years. The next forthcoming symposium is scheduled in Indonesia in 2004.

Once again, I take this opportunity to ASAPE a continuous success in the coming years.

Man-Hway LIN, Ph.D.
ASAPE President
National Taiwan Normal University

PREFACE

This book includes papers presented at the 7th International Symposium of Asian Society for Adapted Physical Education and Exercise (7th ASAPE) held in Hong Kong, August 7-9, 2002. The conference was jointly organized by the Institute of Human Performance, The University of Hong Kong, Department of Physical Education, Hong Kong Baptist University, Department of Rehabilitation Sciences, Hong Kong Polytechnic University, Hong Kong Sports Association for the Physically Disabled, and Hong Kong Sports Association for the Mentally Handicapped. The theme was "Disability Sport, Adapted Physical Education and Physical Activity: Research to Practice". The conference had 8 keynote speeches, 12 oral presentations, 30 poster presentations and 6 video presentations and was attended by over 200 local and overseas participants.

This conference was the first ever held in Hong Kong that focused solely on adapted sport and physical education. We believe 7th ASAPE has provided opportunities for practitioners, scholars and researchers from local and Asian countries to share their research findings and experience working with adapted population. We are particularly impressed with the high quality productions of video presentations that depicted various innovations to improve movement quality of disabled individuals in Japan and Korea.

Hong Kong athletes with disabilities have attained outstanding sport achievements in recent years, for example, we have top world ranking physically disabled fencers and table tennis players, we have also a team of world record 4 X 100 relay Celebral Palsy runners. However, there is much work to be done for adapted physical education in Hong Kong. For example, tertiary institutions can offer specialized adapted physical education training to preservice and inservice teachers.

Lastly, we wish to thank the ASAPE Executive Committee to grant us this opportunity to host the conference in Hong Kong. We also thank the Hong Kong Baptist University and the University of Hong Kong for financial and resource support.

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KEYNOTE SPEECH

The Paralympic Movement and Adapted Physical Education

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International Paralympic Committee

Paralympics stands for the worldwide movement for the promotion of sports for people with disabilities. Although the term has been used in the sixties and seventies, it was first introduced officially in 1988 at the Seoul "Paralympic Summer Games", when it was held in conjunction with the Olympic Games. Since then, it has been adopted as a word that represents the philosophy of providing sporting opportunity for the disabled through the principles of equal opportunities and full participation, and the recognition of elitism of sports for athletes with disabilities.

A summary of the developmental history of the Paralympic Movement and Paralympic Games will be first presented, followed by a description of the current international status of this movement and an analysis of its relationship to adapted physical education. An attempt to look ahead at the future of its development will also be described.

The first reported "sport for the disabled" was a group of amputee golfers in the United States after the First World War. After the Second World War, sports was gradually introduced as an accessory modality of rehabilitation in a number of countries, as part of the "healing" process for the young war veterans who sustained disabilities from war injuries. It started with hospitals and the early rehabilitation centres in the western countries, as well as a number of Asian Pacific areas such as Japan, Australia, New Zealand and Hong Kong.

The most notable rehabilitation hospital in this development was the Stoke Mandeville Hospital in Aylesbury, England. It started with Sir Ludwig Guttmann who introduced sports as the regular rehabilitation programme. The pioneer in Asia was Dr. Nakamura, who, like Sir Ludwig Guttmann, adopted a holistic approach to rehabilitation, and introduced the "barrier-free community" in Beppu. The Japan Sun Industry became the counterpart of Stoke Mandeville in Japan. In Hong Kong, it was Sir Harry S Y Fang who pioneered the many initiatives of rehabilitation. Together with Dr. John Grant, the President of the Paralympic Games Organizing Committee of the recent Sydney Paralympic Games, these three gentlemen created the FESPIC Games and FESPIC Federation in 1976.

The Federation for Deaf Sports (CISS) was formed in the thirties, whereas those for the paraplegics / quadriplegics (ISMWSF), amputees and other locomotor disabilities (ISOD), the cerebral palsied (CP-ISRA), blind (IBSA) and intellectually disabled (Special Olympics and INAS-FID) were all formed after the Second World War. The first international competition was organized by Sir Ludwig at Stoke Mandeville, with two countries, U.K. and Holland. It quickly expanded and grew, and progressed in a four-year cycle to be hosted in various international cities.

The 1988 Seoul Paralympic Games was a milestone for the Movement as it officially linked the Olympic and Paralympic Games together, using the same Games venues and Athletes' Village. From then on the two Games were linked together.

The Winter Games started a little later, with the first one in Onskoldsvik in Sweden, and the recent one in Salt Lake City in 2002.

The FESPIC Games originated from Beppu, Oita, and it soon became the most prestigious games in the Asian Pacific Region. Hong Kong hosted it in 1982. The Bangkok Games in 1999 marked a significant milestone of linking the Asian Games to the FESPIC Games, to be followed by the Busan Games in 2002.

Summarizing the development of the Paralympic Movement, it can be grouped into seven distinct phases:

(1) Experimentation with Rehabilitation

Early initiatives to introduce sports as a form of rehabilitation were often led by orthopaedic surgeons or rehabilitation specialists, with most of the work carried out by physiotherapists. The latter profession then further specialized or branched out to become sports physiotherapists, play therapists or recreational therapists. The physical education profession also started to develop adapted physical education when special schools were established specifically for disabled students. From those experimentation and development, sports became a standard element of rehabilitation centres, special schools, and soon introduced to community centres with formation of interest groups, clubs or fraternities.

(2) Social Rehabilitation and Formalization

With time the interest groups started to form more organized communities and associations, either as disability or sports specific groups. They began to play a more important part in the community activities, and soon earned recognition from the government and recognised legally as the national representatives. This type of community participation was vital in the promotion of the principles of equal opportunities, and greatly enhanced the development of leadership among people with disabilities, and other active participants.

(3) Competition, Rules and Regulations and Classification

In the sixties and seventies, it became apparent that sports competitions were getting more serious, and appropriate rules and regulations were essential to keep the championships proper and free from bias. Classification became a must for athletes with disabilities due to the different levels of impairment and various degrees of rehabilitation and training potential, which directly determined the level of performance. The early competitions tended to follow the popular able-bodied sports: Archery, athletics, swimming, wheelchair basketball, and later table-tennis, tennis, shooting, fencing, lawn bowl, etc. Other forms of sports were introduced specifically for specific disability groups such as goalball (for the blind) and boccia (for the severe cerebral-palsied). Competitions initially were very conservative, e.g., limiting track events to short distance races, fearing that exceeding the physiological limitation of disabled athletics might be injurious to health. Soon it was realized that this arbitrary limitations were well below the potential of athletes, and more strenuous events were introduced, including the Marathon for all categories.

(4) Classification Transformation

The early classification system were done exclusively by medical doctors, and therefore naturally based on degrees of anatomical impairment or physiological disability or dysfunction. It did not take into account the biomechanics and biophysiology of the sports. Soon it was realized that such classification could not practically apply to all sports; and it also created too many classes, making a competition / event not competitive at all. The "Functional Classification" concept was introduced in the early eighties, first in wheelchair basketball, then to swimming and later athletics and eventually all other sports. This classification concept was entirely sports specific, taking into account the functional requirements of body biomechanics and physiokinetics for a particular sport performance. The combined classification systems for athletes with musculo-skeleto-neurological disabilities, e.g. spinal cord injury, amputees, congenital impairments, and even cerebral palsied are now well established and validated through many competitions, so that the number of classes are less and competitions are more intense and spectacular. The assessment for classification is based on the physiological potential of an athlete, done by bench test / assessment, as well as confirmation by classifiers observing the athletes performing the specific sport, such as swimming in the pool, throwing a discus in the field, playing table-tennis, or passing a basketball. Furthermore, classifiers are responsible for the observation of athletes during competitions, so that re-classification might be done to allow a fairer competition. Once athletes have been classified in an international competition, and validated by accredited classifiers, they are usually considered to be permanently classified.

(5) Growth, Internationalization and Elitism

With the increase in public profiles of competitions, athletes with disabilities started to attract higher media exposure, and greater public awareness. National and international programmes became highlights of a city or country, and Paralympic competitions were able to involve participation of governments, community leaders and also corporate sponsors. The performance of athletes also made quantum leaps in the nineties, and surpassed all previous expectations. Outstanding athletes are now treated as celebrities and role-models of the society, and such elitism will continue to grow in all countries.

(6) Unity and Solidarity

The early Paralympic Games were loosely coordinated by the different international federations. The International Coordinating Committee (ICC) was formed by the 4 disability federations in 1983. In 1987, a seminar in Arnheim changed the world scene. With dissatisfaction of many athletes and sports leaders, a working Task Force was formed by ICC to look at possible changes to unify all the federations, which I had the privilege of serving. With hard work and multiple meetings for two years, the International Paralympic Committee was formed on 21 September 1989, exactly one week after the closing ceremony the Kobe FESPIC Games.

(7) Professionalization and Integration

Starting from the nineties, the Paralympic Games started to be closely associated with the Olympic Games. At the same time, there was also an initiative to adopt inclusion of Paralympic events in able-bodied World championships, the Commonwealth Games, etc. More professional sports managers and sports professionals were drawn into the Movement both nationally as well as internationally. In 1997, the IPC invited bidding for its permanent headquarters, and eventually moved to Bonn, Germany in 1998. It started to recruit a team of professional staff to look after the affairs of IPC, and its work became more effective and efficient since. During the Paralympic Summer Games 2000 in Sydney, the IPC signed an agreement with IOC, making the Olympic and Paralympic Games a single bidding exercise for interested cities. The IOC-IPC contract was first applied to the Beijing Games in 2008, and would continue for the years ahead.

The IPC is now the supreme governing body of sports for athletes with disabilities. It is responsible for the organization of the Summer and Winter Paralympic Games. There are 22 official sports within the Paralympic family, some directly under the IPC (called IPC sports), others are either independent (such as wheelchair basketball, wheelchair tennis, and sailing), or sports from the disability federations (such as wheelchair fencing, wheelchair dancing, etc.). IPC needs to overlook all multi-disability competitions and all the world and regional championships of the IPC sports to ensure proper organization and sanction of those events. It also looks after the 5 founding IOSDs and the six regions.

There are now 162 member nations in IPC, and they, together with the 5 IOSDs and 22 sports, form the General Assembly of IPC. The 8 office-bearers (the Management Committee) are elected from the General Assembly, and the Executive Committee is formed by these 8 members, together with the 5 IOSD Presidents, 6 Regional Representatives, 2 sports representatives (winter & summer sports) and the representative of the Athletes' Committee.

The development of adapted physical education mainly followed the society needs after the Second World War, and has established in many developed countries. It plays an important part in the nurturing of young athletes with disabilities, but more importantly, demonstrates that physical activities are an essential part of our life, and should not be ignored in our education system and development of our youths. Scientific research in adapted physical education also showed that disabled children who were exposed to adapted physical education performed better in their adapted lifestyle and academic pursuits. The Paralympic infrastructure within a country and internationally thus provide an opportunity for potential athletes to excel and give disabled youths an option to develop their physical potentials to the full. The teaching of adapted physical education in the curriculum of physical education, and introduction of adapted physical education in special schools and ordinary schools with disabled students are the norm in all developed countries. Hong Kong is undoubtedly lagging behind in this development.

Looking towards the future, we need to appreciate the potential of IPC, the Paralympic sports, the IOSDs and member nations, in the whole context of the global socio-politico-economic situation, and governmental support in all IPC member nations. With the IPC-IOC agreement and the potentials of that partnership, there is a perception that there will be more financial income, advertising opportunity or political influence waiting for IPC. These are not necessarily the case, and this international expectation must be realistically contained. The success of IPC will depend on the performance of our athletes, the organization and image of our Paralympic Games, and the leaderships of our Movement. We need to ensure fair competitions among our athletes, and establish classification systems and processes that do not lead to any ambiguity or unnecessary conflicts. The eligibility of intellectually disabled athletes must be defined so that the scandal of Sydney 2000 would not be repeated. Doping control must be vigilant enough so that our athletes cannot win by cheating. Overall, our officials, classifiers and athletes must maintain a high standard of integrity. Marketing, sponsorship and broadcasting are important initiatives which can add to the profile and potential of the Paralympic Movement. However, if not handled ethically and properly, it can backfire and cause our own destruction. With the many constituencies of the IPC, governance and empowerment need to be defined, so that a global network and supporting structure can be developed and put into action.

Paralympic sports are important building blocks of the Movement, and their synergistic relationship with the IPC and national Paralympic Committees are vital for the future. In recent years, each sports section has been trying hard to look for its own direction and a more sustainable future. Options include going "independent" of IPC, or affiliating with able-bodied international federations. At the end of the day, it is the leadership, management and strategy for development that would determine if a sport can grow or not. The most important success factors are the global infrastructure, with leadership in all regions, and a pool of active and dedicated human resources and expertise.

The disability-specific international federations (IOSDs) had been facing an identity crisis since the formation of IPC, and their existence was also threatened by the growth of sports. Some IOSDs such as IBSA and CP-ISRA were able to define a new role for development and working in partnership with the Paralympic sports, but others are still searching for a future.

The basic building blocks of the Paralympic Movement are the national members, and all of them are facing challenges at different levels and different dimensions. They have to constantly address the various priorities in their own community. Many questions are regularly being asked, e.g.: Should development be led by rehabilitation or sports leaders? Are rehabilitation objectives more important than sports performance? Should sports be promoted in segregated special centres, or should they be integrated in common community programmes? All these questions are facing our national Paralympic leaders, but they cannot be solved by a simple, single approach. In some countries there are still significant discrimination for disabled people, and lack of social and economic support. Although the principle of "Equal Opportunities" are proclaimed by many countries, none of them can fully implement the policies to ensure the quality of life of people with disabilities can really equate with their able-bodied counterparts. There are also other factors such as transport and access, availability of professions and volunteers, facilities and equipment etc. which limit the scope and speed of development. Another important element is, naturally, the government leadership, who determines the policies and public resources available for such initiatives. In this context, the extent of development in Adapted Physical Education has a great impact in the progress of sports for disabled youths. Only some European and North American countries have mandate to have adapted physical education in all their schools, either special schools or integrated schools, and they are the very countries that excel in the Paralympic Games and Championships, as only an early organized physical education programme in schools can ensure a group of healthy and fully participative young athletes who would commit to excellence.

There are also organizational issues: Government-led organizations usually can take off fast and able to generate the initial enthusiasm of the community. However, the non-government organizations are usually more sustainable, as they are often led by influential leaders of strong conviction and able to generate a lot of voluntary support, and such volunteers become the backbone of the national Paralympic Movement. The recent involvement of commercial sponsors and other business interest might change this scene, but the outcome is not easily predictable.

In conclusion, there will definitely be faster changes in our society, and tenser competitions in all aspects among the stakeholders, and the IPC philosophy and structure would need to adapt to this changing global matrix. At the end, our Paralympic Movement would depend how leaders at different levels are able to facilitate and empower the development of nations, regions and sports.

The Physical and Psychological Benefits of Participation in Special Olympics

Anna Chan
Special Olympics Inc.

Mission

To provide year-round sports training and athletic competition in a variety of Olympic-type sports for persons eight years of age and older with mental retardation, giving them continuing opportunities to develop physical fitness, demonstrate courage, experience joy and participate in a sharing of gifts, skills and friendship with their families, other Special Olympics athletes, and the community.

Philosophy

Special Olympics is founded on the belief that people with mentally retardation can, with proper instruction and encouragement, learn, enjoy and benefit from participation in individual skills and team sports.

Special Olympics believes that consistent training is essential to the development of sports skills, and that the competition among those of equal abilities is the most appropriate means of testing these skills, measuring progress, and providing incentives for personal growth.

Special Olympics believes that through sports training and competition, people with mental retardation benefit physically, mentally, socially and spiritually; families are strengthened; and the community at large, both through participation and observation, is united in understanding people with mental retardation in an environment of equality, respect and acceptance.

In 1968 Special Olympics founder Eunice Kennedy Shriver organized the First International Special Olympics Games at Soldier Field, Chicago, Illinois, USA with 1,000 athletes from 26 US states and Canada. The concept was born in the early 1960s when Mrs. Shriver started a day camp for people with mental retardation. It started with three events: athletics; aquatics and floor hockey. Mrs. Shriver saw the individuals with mental retardation were far more capable in sports and physical activities than many experts thought. For the past three decades, under the leaderships and hard working of Mrs. Shriver and her husband Mr. Sargent Shriver, Special Olympics continues to grow and develop, to strive to better the lives of the athletes and the people around them.

Dr. Timothy P. Shriver is now the President and Chief Executive Officer of Special Olympics who serves over one million Special Olympics athletes and their families in 150 countries worldwide.

What Can One Benefit from Participating in Special Olympics

A well planned year-round sports training will definitely improve an athlete with or without mental retardation to become a better and stronger person. Special Olympics athletes especially, can take advantage of having teachers, coaches, volunteers, family members and staff from Special Olympics office to ensure the program is well kept and followed. A variety of sports opportunities are provided for all ability levels. Ability groupings are created through a process called divisioning in which athletes are divided into competition divisions based upon their ability, age and sex. Competition divisions are structured so that athletes compete against other athletes of similar ability in equitable divisions. Divisioning provides equitable competition (evenness) for all athletes within ability grouping (division). This definition also applies to team competition. Generally, a division will consist of a minimum of three and maximum of eight competitors or teams.

Awards are provided to all participants who compete will encourage and build up confidence of the athletes.

Participation in sports brings significant benefits to people with mental retardation of all ages and abilities. The following benefits also reflect benefits of sports for everyone.

Physical : Physical fitness along with increased coordination, cardiovascular fitness and endurance. Athletes show improvement in many ways, some may be slower than others, yet the out come are similar, better and stronger.

Mental : Knowledge of rules and strategy along with increased self-confidence, and pride. An athlete's attitude about him or herself will change when he or she works harder, accepts praise, and increase self-confidence.

Social : Teamwork, interaction with peers and people without mental retardation; opportunity to travel and learn about other places and interests; family pride and increased community awareness and acceptance. The attitude of athletes after taking part in local or World Games, upon return showed more out going, more willing to share their experiences and their peers look up to them. Family members and friends sense the great transformation of the athletes and appreciate what Special Olympics have brought out the better of each individual who participate.

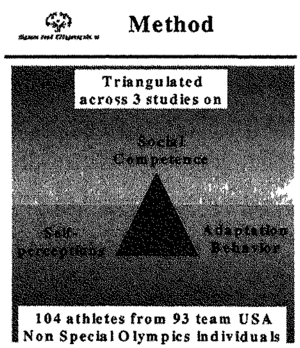
There were many positive outcomes that will take days to report. Coaches; teachers; family members or volunteers can easily name a handful of such success experiences like we have viewed in the tape.

Research

Dr. Elizabeth Dykens has verified the above benefits together with Dr. Donald Cohen in their study entitled "Effects of Special Olympics International on Social Competence in Persons with Mental Retardation." in 1996.

Objective

To evaluate the social and emotional goals of Special Olympics facilitates social competence and self esteem in persons with mental retardation (mean age 22 from 9 to 22; IQ 59 taken from 54 males and 50 females).



Method

Triangulated across 3 studies on

- Social competence
- Adaptation
- Self-perceptions

104 athletes from 93 team USA

- Study 1 — length of time in Special Olympics
- Study 2 — compared team USA to non - Special Olympics
- Study 3 — assessed Team USA before and after their participation in the World Games held in Salzburg Austria

Measures

- Competence
  Parental report using the Child Behavior Checklist
  Number of sports
  Degree of participation
  Skill in sports or non-sports
  Hobbies or games
  Number of paid and unpaid jobs
  Participate in clubs
  Getting along with friends

- Adaptive Behavior
  Vineland Adaptive Behavior Scales
  Communication
  Daily living skills
  Socialization

- Self-perception
  Difficulties to measure in MR
  Projective-type measure
  Question about self

1. Positive self
   a. personality/affect (great /nice/friendly/special/ the best)
   b. physical feature/appearance (beautiful/strong/great muscles/handsome)

2. Achievement
   a. effect (try best/do great/succeed in what try)
   b. school (graduate/get good grades)
   c. job (nurse/fireman/day-care staff)
   d. independent (own apartment/drive/buy a house)
   e. personal goals (learn to dance/read more books)

According to Dr. E. M. Dykens and Dr. D. J. Cohen, the results of their study are as follows:

The Results of Their Study

Relative to age and IQ,

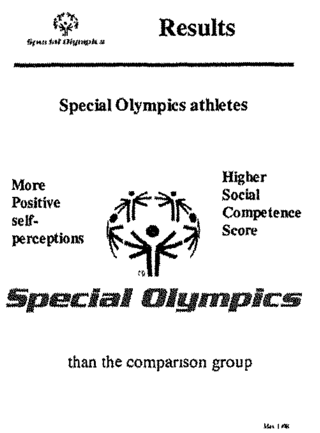
- Length of time in Special Olympics most powerful predictor of social competence
- Special Olympics athletes had higher social competence scores and more positive self-perceptions than the comparison group
- Behavioral data remained stable over time, suggesting that the high pre-Game scores were not simply a function of parental or athlete pre-game excitement.

Conclusions

Based on the most conservative meaning of triangulation, more support was found linking Special Olympics to social competence than to remaining behavioral domains.

The Results for the Athletes Include:

- Richer, more rewarding life,
- Skills, and confidence applied to school, work, home, and social life, and
- Leadership



Special Olympics Program continues to grow over the years. A total of 26 Olympic-type Summer and Winter sports events are designed to serve age eight and above with all ability levels. Additional programs such as:

Special Olympics Unified Sports Program: A service learning component to encourage youth without mental retardation to become team players with youth with mental retardation.

Athlete Leadership Program (ALPS): Athletes will have the opportunity to serve as board member; as coaches; officials and volunteers at the Games.

Special Olympics Healthy Athletes: Seeing the need to help Special Olympics athletes to be a all round individuals, to improve their health and fitness. Free screenings and examinations were designed and conducted by health care professionals to perform SO Special Smile-dental care; SO Lions Clubs International Opening eyes-vision check; Healthy hearing-hearing screenings; SO Funfitness for athletes to learn injury prevention through stretching exercises. SO Health Promotion for athletes to learn the components of a healthy lifestyle-regular exercise and good nutrition choices.

SO Get Into It: The goal is to increase the numbers of children and youth in schools or universities who are without mental retardation to participate in Special Olympics programs and activities. They benefit not only in developing more tolerance of diversity also academic rewards.

Family Support Network: Special Olympics families have an opportunity to mentor families who are new to Special Olympics, with informational and emotional support.

The growth and progress of Special Olympics over the past years has been phenomenal. Over one million athletes are now served in over 150 countries and the vision is to serve two million athletes by 2005.

The upcoming event will be the 11th Special Olympics Summer World Games to be held in Dublin, Ireland June 2003.

In 2005, Japan will hold the 8th Special Olympics Winter Games in Nagano. In May 2002, China was awarded the privilege of housing the 2007 12th Special Olympics World Summer Games in the city of Shanghai. It is expected that 7,000 athletes, 3,000 coaches and official delegates, and more than 30,000 volunteers and 28,000 families and friends will take part.

Special Olympics Athletes not only gives athletes the chance to participate in the World Games, but also the year-round local programs which will help them to improve on a daily basis, thus resulting in higher social competence among athletes, decreased behavior problems. Athletes can then carry these benefits with them into their daily lives at home, in the classroom, on the job and in the community.

The goal of Special Olympics is to help bring all persons with mental retardation into the larger society under conditions whereby they are accepted, respected and given a chance to become productive citizens.

A very touching moment occurred in a Special Olympics track and field competition. Towards the end of the race near the finish line, as the athletes were being cheered by the crowd, an athlete fell and the leading athlete turned around, picked up the athlete who fell and they finished the race together.

The spirit of sportsmanship and love of participation is reflected in the Special Olympics Oath:

Let Me Win
But if I Cannot Win
Let Me Be Brave
In The Attempt

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Website: www.specialolympics.org

Postural Adjustments in Individuals with Visual Impairments

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Introduction

Three sensory systems contribute to the maintenance of an upright standing posture in humans: the visual, vestibular and somatosensory systems. If the postural control systems in humans are assumed to require information from all three sensory systems in order to achieve or maintain optimal postural stability, the absence of information from one sensory system may have an influence on spontaneous body sway during quiet stance. The ischemic blocking of leg afferents (Mauritz & Dietz, 1980) causes an overshoot in body sway. Somatosensory loss due to a pressure cuff around the legs affects ankle muscle proprioception (Diener et al., 1984). Vestibular loss also causes postural instability (Brandt & Dieterich, 1996). Vision plays a major role in the multisensory process of postural stabilization. Previous studies have demonstrated that vision has positive effects on postural control in humans (Edwards, 1946; Lee & Lishman, 1975; Woollacott, Debu, & Mowatt, 1987; Paulus, Straube, & Brandt, 1987). These findings indicate that afferent information from all three sensory systems is essential for the appropriate control of a standing posture.

Balancing Ability of Individuals with Visual Impairments

Individuals with visual impairments, especially those who are blind from birth, have never received any visual stimulation. In spite of the absence of vision from birth, they have learned various movement activities and motor skills needed in daily physical activities, such as orientation and mobility skills (Kratz, 1973; Blash, Wiener, & Welsh, 1997). Their motor performance depends solely on sensory inputs provided by the remaining nonvisual sense modalities, especially haptic, proprioceptive, vestibular, and auditory ones. In this sense, both muscular activity and movement coordination for postural control could be developed in people with congenital total blindness through nonvisual motor learning from birth. They control postural sway with the residual systems, consisting of the somatosensory and vestibular systems. The postural control systems without visual feedback may be more unstable than those of sighted persons. Most studies on balancing ability in blind persons have revealed that sighted persons perform better in static or dynamic balance tasks than individuals with visual impairments.

Comparative sway of two blind and five sighted subjects is shown in Table 1 (Edwards, 1946). Blind subjects swayed more than the sighted. Edwards emphasized that the vision is the greatest importance for body steadiness. Table 2 shows performance of static and dynamic balance in congenitally blind, sighted with eyes open, and sighted blindfolded students (Ribadi, Rider, & Toole, 1987). The sighted subjects did significantly better than the blind subjects on the static and dynamic balance tasks.

Table 1: Comparative Sway of Two Blind and Five Normal-seeing Subjects (Edwards,1946)

	Mean	Medium	SD
Normal controls (50 trials)			
Open	85.8	84.5	45.4
Closed	135.5	156.0	72.8
Blind Ss (20 trials)			
Open	304.75	322.5	121.1
Closed	283.75	272.5	119.0

Table 2: Means (time on balance) and Standard Deviations of Static and Dynamic Balance (Ribadi, Rider, & Toole, 1987)

Group	Sex		Static Balance (seconds)		Dynamic Balance (seconds)	
(n)	M	F	M	SD	M	SD
Congenitally Blind (17)	9	8	1.57	.55	11.03	1.11
Sighted (17)	9	8	2.22	.68	13.52	1.35
Sighted Blindfolded (17)	9	8	1.20	.38	10.00	1.05

These studies suggest that individuals with visual impairments who depend on the residual sensory systems have difficulty in maintaining an upright posture during static and dynamic balance tasks. It is not clear, however, whether or not the poor performance of blind people could be attributed to their lack of visual capability, the absence of normal visual experience, or delayed motor development.

Automatic Postural Adjustments of Individuals with Congenital Total Blindness

In order to fully understand the postural control systems of people who are blind from birth, it is not enough to gauge performance during static and dynamic balance tasks. If the absence of normal visual experience causes diminished postural adjustments, congenitally totally blind people should show destabilized postural sway or changes in the temporal/spatial patterns of postural responses to support surface translations and rotations.

Nakata and Yabe (2001) used a movable platform to examine automatic postural adjustments of individuals with congenital total blindness. In this study blind subjects maintained their stance equilibrium with the residual senses in response to perturbations. One explanation for this is that blind subjects employ a postural strategy (Horak & Nashner, 1986) that greatly depends on features of the incoming sensory inputs. Another possibility is that both muscular activities and movement coordination are centrally preprogrammed and only triggered by the sensory inputs (Allum, Honegger, & Pfaltz, 1989). In any case, Nakata and Yabe (2001) demonstrated that automatic postural responses occurred in congenitally totally blind subjects as well as in sighted subjects.

In addition, there were no differences in the pattern of EMG activities between blind and sighted subjects in response to platform displacements. This indicates that the development of postural muscles in the lower extremity is unaffected by the absence of vision from birth. EMG amplitude in the EMG onset latencies in the lower extremity muscles for each type of perturbation indicated no significant difference between blind and sighted subjects. These results suggest that the absence of vision from birth may not affect the development of synergies in postural muscles in response to perturbations. Apparently, the neuromuscular development of blind subjects who participated in this experiment remained neurologically intact and unaffected by the absence of vision from birth. The residual afferent systems which have never had visual inputs from birth may have contributed to the maintenance of an upright standing posture by these subjects.

Figure 1 shows the mean reaction times to each type of perturbation in blind, sighted subjects with eyes closed and sighted subjects with eyes open. Mean reaction times of blind subjects were significantly shorter in each type of perturbation than those of sighted subjects with eyes closed. There were significant differences in reaction times to forward and backward translations, and to toe up rotations between blind and sighted subjects with eyes open. No significant difference was found in reaction time to toe down rotations between blind and sighted subjects with eyes open.

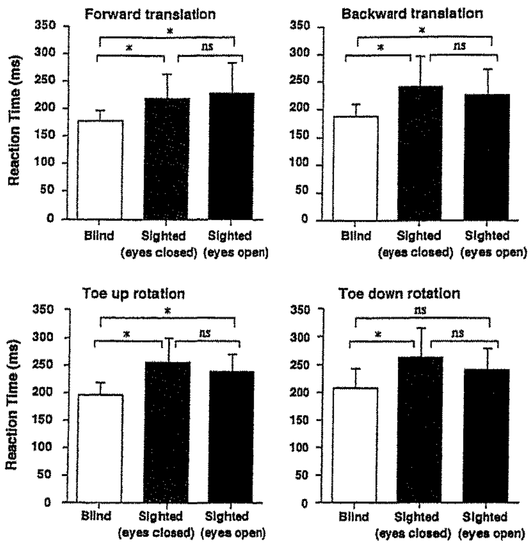

*Fig. 1: Means and Standard Deviations of Reaction Times to Platfrom Displacements in Blind, Sighted Subjects with Eyes Closed and Sighted Subjects with Eyes Open. *Represents a statistical difference (p<0.05). Nakata and Yabe (2001)*

Blind people are highly dependent upon somatosensation as well as auditory information while reading Braille, walking with a long cane, discriminating objects haptically, and participating in other daily activities. They may become more attentive to changes in the support surface (e.g., through their feet) to avoid obstacles or to prevent themselves from falling while walking unassisted with a long cane. The relative contribution of somatosensory or proprioceptive inputs may increase in their daily environment. Horstmann and Dietz (1990) have proposed that the force dependent receptors distributed along the vertical axis of the body are needed to signal the position of the body's centre of gravity relative to the support surface. The possibility remains that blind people may be highly dependent on such receptors. Consequently, simple reaction times to somatosensory stimuli triggered by perturbations were measured in this experiment. Blind subjects had significantly faster reaction times than sighted subjects in response to each of the three types of perturbations, except for a type of toe down rotation. The results suggest that blind subjects have acquired a skill to process somatosensory information from the surface through prolonged nonvisual motor learning (Sunanto & Nakata, 1998). The skill may play an essential role in detecting obstacles, avoiding hazards or preventing falling during gait. The absence of vision from birth might enhance an ability to process somatosensory information as seen in Braille reading. It is unclear, however, whether or not somatosensory inputs are primarily responsible for triggering the automatic postural responses in blind subjects. No significant difference was found in the mean reaction times to toe down rotations between blind and sighted subjects with eyes open. This might be due to the low stimulus intensity generated by toe down rotations, since the RMS values for postural sway were smaller in response to toe down rotations in comparison with those in response to the other three types of perturbations. In EMG onset latencies there were no significant differences between blind and sighted subjects. On the other hand, blind subjects had significantly faster reaction times than sighted subjects in response to each of the three types of perturbations. These results indicate a difference between spinal stretch reflex and voluntary reaction to a stimulus generated by platform displacements. The EMG onset latencies obtained in the stretched muscles are related to stretch reflexes, whereas reaction time requires a volitional act mediated through the motor cortex. The findings suggest that the spinal stretch reflexes in humans are unaffected by the absence of vision from birth. Faster reaction times of blind subjects might result from the extensive use and practice of the somatosensory modality in real-life situations (Kujala et al., 1997).

To assess the ability of subjects to control posture or balance in response to perturbations, the present study focused on postural sway before, during, and after perturbations. Figure 2 shows RMS values for postural sway before, during, and after perturbations in blind, sighted subjects with eyes closed, and sighted subjects with eyes open. One would expect that the absence of vision from birth would affect postural sway during and after perturbations. No significant differences, however, were found in RMS values for postural sway during and after perturbations between blind and sighted subjects, although blind subjects swayed more after backward translations than sighted subjects with eyes open. These findings provide good evidence that blind subjects have learned to compensate for the loss of vision from birth by enhanced sensitivity to feedback from other sources.

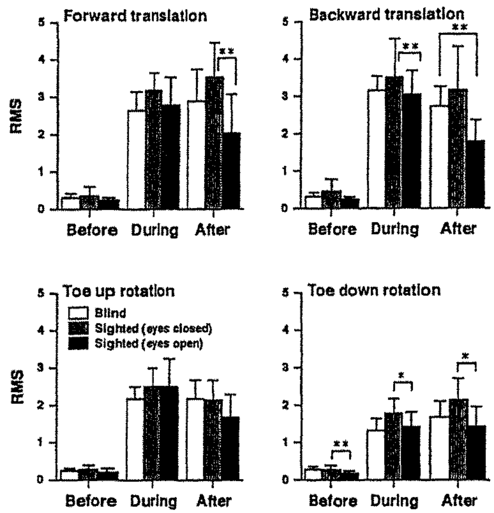

Fig.2: Means and Standard Deviations of RMS Values for Postural Away Before, During, and After Perturbations in Blind, Sighted Subjects with Eyes Closed and Sighted Subjects with Eyes Open.
**Represents a statistical difference *$p<0.05$, **$p<0.01$. Nakata and Yabe (2001)*

Adelsen and Fraiberg (1974, 1976) reported that the gross motor development of infants blind from birth fell within the sighted age range in postural items testifying to neuromuscular maturation in control of the head and trunk. The items observed longitudinally from birth to two years were: " sits alone momentarily," "takes stepping movements when hands are held," and "stands alone". This finding seems to indicate that postural control systems are unaffected by blindness from birth. It may be concluded, therefore, that the automatic postural response systems are unaffected by the absence of vision from birth and are rather hard wired.

Vision and Motor Skills

Previous studies have showed that vision plays an essential role in maintaining posture. This is true for people with seeing eyes, but not for people with no vision from birth. Most of people with seeing eyes, even physical education teachers of schools for the blind, still have the old idea that motor skills cannot be achieved well without vision. This implies that teaching is useless. Millar (1991) demonstrated that congenitally blind children show mental practice effects for movements which cross the body midline. This suggests that visuo-spatial mediation is not necessary for these effects to occur. It should be noted here that vision is not essential for motor learning.

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KEYNOTE SPEECH

Classification of Athletes in Paralympic Games

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Paralympic Games is an Olympic Game for the Physically Disabled and Intellectually disabled. In fact, the word "Paralympic" in the phrase "Paralympic Games" means "parallel" to the Olympic Games and does not come from the word "paraplegia" or "paralysis". The Olympic Motto is 'Citus, Altius, Fortius' while the Original Paralympic Motto is 'Mind, Body, Spirit' and the latest Paralympic Motto is ' Spirit in Motion'". They both would perform as much as they are able. Disability is not a question for paralympain in striking for an excellence. Perhaps the key question of the competition would then be "How do athletes with differing disabilities compete fairly?".

Medical Categories

We have different categories of athlete beyond paraplegia, namely, amputee, cerebral palsy, intellectual disability, les autres and vision-impaired.

The six medical categories are (in alphabetical order):

1. Amputee
   Includes athletes who have at least one major joint in a limb missing (ie. Elbow, wrist, knee, ankle). Depending on the sport, some amputees compete as wheelchair athletes (e.g. tennis, basketball).

2. Cerebral Palsy
   A disorder of movement and posture due to damage to an area, or areas, of the brain that control and co-ordinate muscle tone, reflexes, posture and movement.

3. Intellectual Disability
   A person with an intellectually disability must have substantial limitation in present functioning characterized by below average intellectual function and limitations in adaptive skill areas.

4. Les Autres

   Les autres is French for "the others". It is a term used to describe athletes with a range of conditions which result in locomotor disorders that have not fitted into the traditional classification system of disability groups

5. Vision Impaired

   This refers to any condition which interferes with 'normal' vision. This incorporates the entire range of vision difficulties from correctable conditions through to blindness.

6. Wheelchair

   This group includes athletes with a disability who are eligible to compete in wheelchair events. Some of the more common conditions which may result in athletes being eligible to compete include: traumatic paraplegia and quadriplegia (i.e. Spinal injuries, spina bifida, poliomyelitis, amputees, cerebral palsy and all non ambulant les autres athletes).

Classification

Athletes compete within six categories at a Paralympic Games. The athletes are placed in to a class within their categories, i.e. they are classified. They are classified by an expert team of officials with sports and or medical background- known as international classifier. The class the athletes are placed in depends on their "Functional Ability" and not their disability category. This is totally different from the "Medical Orientated" classification based on the medical condition they have. Perhaps it is a more "Technically Orientated" classification that the athlete is viewed participating in their chosen sport which, coupled with the results obtained from the medical examination, allow the examiner to consider his/her ability and the class for that specific sport.

Take swimming as an example, they will be examined medically to document the basic levels of functional ability, muscle tone and power, dysfunction, balance, co-ordination, gross and fine activities, range of motion, and length of amputation stump; each level is allotted points. More importantly, they will be observed and evaluated in the pool for their performance during dive start, lap swim for at least 50m strokes including a turn at a relatively fast pace. During this "Water Test", the classifier will assess their true function of the leg/arm, ability to dive start, push-off when turning, stability and drag throughout the stroke.

This means that if an athlete uses a wheelchair for mobility he/she will compete not only against other wheelchair athletes but also against amputees or those with cerebral palsy because of same/or similar functional ability. This functional classification is sports specific and puts an athlete's ability into perspective by listing the relevant skills to perform a certain sport rather than only assessing an athlete from a medical point of view. This means athletes from two different disability categories (e.g. cerebral palsy and amputation) can be placed in the same functional class for some events (e.g., 100m freestyle swimming) because they have the same, or similar, functional ability. This functional approach is supported by biomedical researches and sports science studies. The athletes are therefore raced only against athletes of that particular class and not against all fellow competitors.

The team sports of wheelchair basketball and wheelchair rugby have a points system in operation. Each player is given a points rating, and the whole team have a maximum points on the court at any one time.

There are 18 full-medal sports on the Sydney 2000 Paralympic Games program. Due to the physical demands of each sport, not all disability categories can compete in all 18 sports.

For example, judo and goalball are played only by vision-impaired athletes; football is played only by cerebral palsy athletes; whereas sports like swimming and athletics are open to all six disability categories.

Athletes participating in Winter Paralympic Games are largely divided into three categories: LW classes (competitors with locomotive disabilities); sitting LW classes; and B classes (Competitors with visual impairment) depending on their disabilities and requirement of ski equipments.

Governing Bodies

The six physical disability categories at Sydney 2000 Paralympic Games are governed by five international Sporting federations:

Vision Impaired	International Blind Sports Association (IBSA)
Cerebral Palsy	Cerebral Palsy-International Sport & Recreation Association (CP-ISRA)
Wheelchair	International Stoke Mandeville Wheelchair Sport Federation (ISMWF)

Amputees/Les Autres	International Sports Organisation for the Disabled (ISOD)
Intellectual Disability	International Sports Federation for Persons with an Intellectual Disability (INAS-FID)

Each of these five governing bodies for sport set the guidelines for the classification of their athletes together with International Paralympic Sports Federations (IPSF). The IPSF and the ISOD certify and nominate the international classifiers to classify the athletes. Each individual federation would also organize, accredit, review and revise their classification system regularly as well as monitoring of the class of the athletes.

Athletes are not classified only once. It would be performed a number of times throughout an athlete's career. They may be re-classified as their ability or mobility improves or deteriorates.

There is a system of protest to allow the NPC team manager to protest against his/her own classification or that of another athlete. A protest panel make up of independent classifiers not involved with the original classification, will bear the protest and make a ruling.

International Blind Sports Association (IBSA) Classes

B1 An athlete in this class will either have no light perception at all in either eye or may have some light perception but an inability or recognise the shape of a hand at any distance or in any direction.

B2 The athlete can recognise the shape of a hand and the ability to perceive clearly will be up to *2/60. The visual field of the athlete is less than five degrees.

B3 The athlete can recognise the shape of a hand and the ability to perceive clearly will be above 2/60 up to 6/60. The visual field of the athlete varies between more than five degrees and less than 20 degrees.
*(2/60: A person can see at two metres what is normally seen at 60 metres)

Cerebral Palsy International Sport and Recreation Association (CP-ISRA) Classes

CP1, CP2, CP3, and CP4 classes of athletes with Cerebral Palsy use a wheelchair during competition (excluding swimming).

CP5, CP6, CP7, and CP8 describe athletes with Cerebral Palsy who do not use a wheelchair during competition.

CP1 Athletes with poor functional range of movement and poor functional strength in arms, legs and trunk.
The athletes uses electric wheelchairs or assistance for mobility. They are unable to propel a wheelchair. The athletes compete in a wheelchair.

CP2 Athletes with poor functional strength in arms, legs and trunk. The athletes are able to propel a wheelchair. The athletes compete in a wheelchair.

CP3 The athlete shows fair amount of trunk movement when pushing a wheelchair, but forward trunk movement is often limited during forceful pushing. Although showing some trunk movement while throwing motions are mostly from the arm. The athletes compete in a wheelchair.

CP4 The athlete shows good functional strength with minimal limitations or control problems in arms and trunk. The athlete shows poor balance. The athletes compete in wheelchairs.

CP5 The athlete has normal static balance, but shows problems in dynamic balance. A slight shift of center of gravity may lead to loss of balance.
The athlete may need an assistance device for walking, but not necessarily when standing or throwing (= filed events in athletics). The athlete may have sufficient function to run on the track.

CP6 The athlete does not have the capability to remain still; they show involuntary cyclic movements and usually all four limbs are affected.
The athlete is able to walk without any assistance. They usually have more control problems with the arms and they have better leg functions than CP5, especially when running.

CP7 The athlete has uncontrollable muscular spasm in one half of the body. They have good functional abilities in the dominant side of the body. They walk without assistance but often with a limp due to uncontrollable muscular spasms in the leg. While running, the limp may disappear almost totally.
Their dominant side has better development and good follow-through movement in walking and running. Arm and hand control is only affected in the non-dominant side, good functional control is shown on the dominant side.

CP8 The athlete shows a minimum of uncontrollable spasms in either one arm, one leg or one half of the body. To be eligible, these athletes need to have a diagnosis of cerebral palsy or other non-progressive brain damage.

Examples of Sports-specific Classification

Individual Sports: Athletics

In Athletic competitors from all six disability categories compete:

- Visually impaired athletes, represented through the International Blind Sports Association (IBSA)
- Intellectually disabled athletes, represented through the International Sports Federation for Persons with an Intellectual Disability (INAS-FID)
- Cerebral Palsy athletes, represented through the Cerebral Palsy-International Sports and Recreation Association (CP-ISRA)
- Amputees and athletes with other disabilities (les autres), represented through the International Sports Organization for Disabled (ISOD)
- Spinal Cord injury athletes competing in wheelchairs, represented through the International Stoke Mandeville Wheelchair Sports Federation (ISMWSF)

Therefore the classes nomenclatures in structured accordingly:

- Classes 11, 12, 13 cover the different levels of vision impairment
- Class 20 covers intellectually disabled athletes
- Classes 32-38 cover the different levels of cerebral palsy
- Classes 42-46 cover the different levels of amputations and other disabilities (Les Autres)
- Classes 51-58 cover the different levels of spinal cord injuries

Individual Sports: Swimming

Swimming is the only sport that combines the conditions of limb loss, cerebral palsy (coordination and movement restriction), spinal cord injury (weakness or paralysis involving any combination of the limbs) and other disabilities (such as dwarfism, major joint restrictions) across classes. All classes begin with an 'S'.

- Classes S1-S10 are for swimmers with a physical disability
- Classes S11-S13 are for swimmers with a visual impairment
- Class S14 is for swimmers with an intellectual disability
- The prefix 'S' to the class denotes the class for freestyle, backstroke and butterfly

- The prefix 'SB' to the class denotes the class for breaststroke
- The prefix 'SM' to the class denotes the class for individual medley

The range is from the swimmers with severe disability (S1, SB1, SM1) to those with the minimal disability (S10, SM9, SM10).

In any one class some swimmers may start with a dive or in the water depending on their condition. This is factored in when classifying the athlete.

Below are some examples of swimming functional classes.

S1, SB1, SM1 Swimmers who have severe coordination problems in four limbs or have no use of their legs, trunk, hands and minimal use of their shoulders.

S2, SB1, SM2 Similar disabilities to class S1 but these athletes would have more propulsion by using their arms and legs.

S3, SB2, SM3 Swimmers with reasonable arms strokes but no use of their legs or trunk. Severe limb loss to four limbs. Athletes in this class would have increased ability when compared with S2.

S4, SB3, SM4 Swimmers who use their arms and have minimal weakness in their hands but have no use of their trunks or legs. Swimmers with co-ordination problems affecting all limbs but pre-dominantly in the legs. Also for severe limb loss to three limbs. Increased ability when compared with S3.

S5, SB4, SM5 Swimmers with full use of their arms and hands but no trunk or leg muscles. Swimmers who still have co-ordination problems.

S6, SB5, SM6 Swimmers will full use of their arms and hands, some trunk control but no useful leg muscles. Swimmer with co-ordination problems although usually these athletes can walk. Also for dwarfs and swimmers with major loss in two limbs.

S7, SB6, SM7 Swimmers with full use of their arms and trunk with some leg function. Swimmers with co-ordination or weakness on the same side of the body. Limb loss in two limbs.

S8, SM7, SM8 Swimmers with full use of their arms and trunk with some leg function. Swimmers with use of one arm only or some limb loss.

S9, SB8, SM9 Swimmers with severe weakness in one leg only. Or swimmers with very slight co-ordination problems or with one limb loss. Usually these swimmers start out of the water.

S10, SB9, SM10 Swimmers with minimal weakness affecting the legs. Swimmers with restriction of hip joint movement. Swimmers with some deformity in their feet or minor loss of a part of a limb. This class has the most physical ability.

S11, SB11, SM11 These swimmers are unable to see at all and are considered totally blind. They must wear blackened goggles in this class and will require someone to tap them when they are approaching the wall. B1 athletes.

S12, SB12, SM12 These swimmer scan recognize shapes and have some ability to see. There is s large range of vision ability within this class. B2 athletes.

S13, SB13, SM13 Swimmers who have the most sight but legally are still considered to have a vision-impairment problem. B3 athletes.

S14, SB14, SM14 Swimmers who have a recognized intellectual disability according to the international standards of the World Health Organization (WHO) and adopted by the governing sports body, INAS-FID.

Team Sports: Basketball - Wheelchair

To be eligible to play wheelchair basketball a player must have a permanent physical disability in their lower limbs, which prevents them from running, jumping and pivoting as an able-bodied player.

Once a player has met this requirement, they are classified to play under the International Wheelchair Basketball Federation's (IWBF) Player Classification System.

By classification, players are assigned a point value from 1.0 through to 4.5 according to their level of physical function. These points are then added together with a team not permitted to exceed 14 points for the five players on court at any given time. This ensures that any player, regardless of degree of disability, has an integral role to play within the team structure.

Observed trunk movements and stability during actual basketball competition, not medical diagnosis, form the basis of player classification.

1 point players — Have no lower limb movement, and little or no controlled trunk movement. Their balance in both the forward and sideways directions is significantly impaired, and they rely on their arms to return to the upright position when unbalanced. These players have no stability in a contact situation and usually rebound overhead single handed.

2 point players — Usually have no lower limb movement, but have some partially controlled trunk movement in the forward direction. They do not have controlled sideways movement or trunk rotation. Players have limited stability in a contact situation, often relying on their hand grip to remain upright in a collision.

3 point players — May have some lower limb movement, and have controlled trunk movement forwards to the floor and up again, and have some rotation control. Players do not have good sideways trunk control, but are more stable in a contact situation and able to rebound overhead with two hands comfortably.

4 point players — Have normal trunk movement, but due to some reduced lower limb function are unable to lean sideways to both sides with full control. Stable in contact and rebounding, with normal forward and rotation movements.

4.5 point players — The players with the least disability on court. Usually only have minimal lower limb dysfunction or single below knee amputation. Normal trunk movements in all directions and very stable in contact and rebounding.

There are situations where a player does not fit into the exact categories for classification. In these cases the classifiers may assign a player a half point above or below a certain class. This creates players with 1.5, 2.5 or 3.5 points assigned to them. The team total of 14 points on court does not alter when this occurs.

Future Developments

With the explosive advancement in wheelchair, prosthetic and orthotic design, biomechanics, sports science, sports medicine, national interest and commercial endorsement, we would see the marked improvements to be made in competitors' performance under a reasonably fair classification system.

Classification of the competitive athletes is not a static process and so are the dissemination of the information and the training of the classifiers. Recruitment of the classifier beyond medically quality personnel like technical members of the sports team is an ongoing process and the future trend.

Workshops for the training of classifiers in different sports are frequently organised before local and regional competitions and championships. One of the regional multi-sports games, Far East & South Pacific Games Federation (FESPIC) is the breeding ground of elite athletes as well as to classify the novice athletes. It is also the training ground of the classifiers of different sports in this region. Interested members of the sports teams should take every opportunity to participate in these workshops and qualify themselves as the certified classifier to promote the fair play of that sport. Qualified classifiers can also update themselves on the recent advances of science and practice of the classification systems through these workshops beyond the unidirectional internet approach.

KEYNOTE SPEECH

Measuring Physical Activity in Children with Intellectual Disability

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Physical activity is defined as "a behavior that characterized by any bodily movement that results in an increase in energy expenditure above resting levels" (Caspersen, 1989). Results from the epidemiological studies have consistently shown that low physical activity levels are associated with most contemporary health problems such as higher risk of coronary heart disease, hypertension, obesity, diabetes, osteoporosis, stress and some types of cancer and emotional disorders (e.g. Hahn, Teutsch, Rothernberg & Marks, 1990; Paffenbarger, Wing & Hyde, 1978; USDHHS, 1996). Most studies on the children's physical activity have been conducted in population with overweight or sedentary lifestyle problems. There is only a small volume of data concerning about the physical activity and physical fitness levels of children with disabilities. Persons with disabilities often adopt inactive lifestyle, which results in lower levels of fitness. For example, Horvat and Frankin (2001) indicated a relatively lower overall functioning and fitness in children with mental retardation. In Hong Kong, Chow, Cheung, Louie and Ma (2001) found that children and adolescents with mild mental retardation had poorer performance in all fitness items compared to the children without disability. However, research evidence suggests that most youth with disabilities have the physiological, anatomical, and psychological capability to adapt to increased levels of physical activity and to improve their physical fitness (Lintunen, Heikinaro-Johansson & Sherrill, 1995). In view of the uncertainty about how physical activity affects the lives of individuals with disabilities, researchers have advocated the need to study the activity patterns and physiological responses to exercise in persons with disabilities (Heath & Fentem, 1997; Rimmer, Braddock, & Pitetti, 1996; Seaman, 1999).

Part I: Field Methods Assessing Children's Physical Activity

Doubly Labeled Water

The doubly labeled water is a biochemical procedure that tracks the rate of body's metabolic processes. It can provide a highly accurate assessment of overall energy expenditure, from which the energy expenditure associated with physical activity can be calculated. The principle of using doubly labeled water is to have a subject ingesting a quantity of water with known concentration of isotopes of hydrogen and oxygen. In the subject's daily urine sample, the difference in eliminating rates of the two isotopes can be shown. Production of carbon dioxide and oxygen uptake can then be calculated (Starling, 2002). The first validation study was conducted by Schoeller and van Santen (1982). They reported a non-significant overestimation energy expenditure (2.1 %) compared with dietary intake over 13 days. For maximum precision, a subject's urine or saliva samples are needed for periods of two-three weeks for an adult, depending on activity level and six to seven days for a child (Montoye, Kemper, Saris, & Washburn, 1996). However, the main drawback of this method is that it is very costly (one measurement: US$400-600), thus, it is not mass testable. Another drawback is that it does not give information on the physical activity pattern. It has been often used as a criterion measure in validation study for comparing results with another field measure. It has been also used in research to assess physical activity of school children with spina bifida (Bandini, Schoeller, Fukagawa & Dietz, 1989), cerebral palsy (Stallings, Zemel, Davis, Cronk, & Charney, 1996; van den Berg-Emons et al., 1995), and Prader-Willi Syndrome (Davis & Joughin, 1993).

Heart Rate Monitors

Electronic and mechanical devices such as heart rate monitors, motion sensors and pedometers are common field measures of physical activity. Heart rate monitors provide an objective indicator of the physiological effect of physical activity, which is an indirect method of assessing physical activity. However, although heart rate responses to moderate intensity of activity correspond to a linearly and positive relationship to oxygen consumption and energy expenditure, other factors such as psychological stimulus, high humidity, type of muscular contraction, hydration and fatigue may influence heart rate responses, particularly during resting conditions (Janz, 2002). Moreover, heart rate monitors are less accurate when heart responses fall under 120 beats per minute due to the influence of emotional factors. Another measurement concern is the temporal lag of the heart rate responses to the physical activity.

Motion Sensors

Similar to heart rate monitors, using motion sensor device is another objective but direct method of assessing physical activity. Motion sensors indicate the physical activity by tracking the body movement. Numerous studies have examined the reliability and validity of these devices in children under both lab (Trost, Ward, & Burke, 1998) and field conditions (Eston, Rowlands, & Ingledew, 1998; Janz, 1994; Welk & Corbin, 1995). The limitations of motion sensors include their inability to detect activities involved with upper body, catching and throwing, carrying a load, running up a slope, non-locomotor and water-based activities.

Pedometers

Pedometers, one kind of the motion sensors, provide an objective measure of steps counts in response to vertical movement of the body. Pedometers are ideal for assessing children's physical activity because they are cost effective, inexpensive, small in size, easy to use and they cause no disturbance in daily activities (Rowlands, Eston, & Ingledew, 1999; Weston, Petosa, & Pate, 1997). They possess similar benefits and weaknesses to other motion sensors but with less accuracy and precision. The main weakness is that pedometers cannot provide details of intensity levels, frequency and pattern of physical activity since they do not have internal clock time sampling capabilities. Therefore, their ability to predict energy expenditure is limited. However, researchers found that pedometers were sensitive to walking behaviors (e.g. Bassett, 2000; Freedson & Miller, 2000). Results from a study on 7-12 years old children indicated that pedometer readings were highly correlated with recreational activity and classroom activity (Kilanowski et al., 1999). In another study with younger children of 4-6 years old, Bassett et al. (1996) showed that pedometer readings were highly correlated with observation of physical activity. In terms of monitoring protocol, researchers found that a few days of monitoring can provide confident estimates of habitual activity when pedometer data are averaged to yield steps per day (Bassett & Strath, 2002). Tudor-Lock and Myers (2001) provides an extensive review on measurement issues of using pedometers. Although pedometers have inherent shortcomings, since they are inexpensive, pedometers can serve as a motivator of exercise class or weight loss intervention classes for obese children. Although, the daily goal of steps for children has not been set, a recommendation of 10,000 steps as a daily target for an adult have been advocated by Japanese researchers (Hatano, 1993; Yamanouchi et al., 1995). Further scientific evidence is needed to substantiate this targeted number of steps per day.

Accelerometry-based Activity Monitors

Accelerometry-based activity monitors are motion sensors that can detect segmen or limb acceleration. This information provides an index of movement since acceleratior reflects the rate at which distance is covered. Accelerometry-based activity monitor: are now commonly used by researchers to assess physical activity because they are small, noninvasive, and provide an objective record of overall physical movement The newer models of accelerometers are smaller in size (the electronic pager size) anc they allow for data to be set as time-sampling periods (e.g. 1-minute interval) for 10 tc 30 days storage to be downloaded to a computer. Therefore, accelerometers are superio to pedometers as they can give time-sampling information on the physical activity patterns. However, these instruments are costly (each costs US$200-$500). The Computer Science and Applications (CSA) monitor, a uniaxial instrument, is the mos widely used accelerometers. Equations have been developed to estimate energy expenditure (Freedson, Melanson, & Sirard, 1998). Biotrainer, another uniaxia instrument, allows pre-setting recording sampling frames ranging from 15 seconds to 2 minutes. The Tritrac is a triaxial monitor that yields a composite three-dimensiona score called the vector magnitude.

The validity studies of accelerometers include criterion measures of laboratory conditions such as oxygen consumption (Nichols, Morgan, Sarkin, Sallis, & Calfas 1999; Welk, Blair, Wood, Jones & Thompson, 2000) and field conditions, which are doubly labeled water (Bouten et al., 1966; Ekelund et al., 2001; Fogelholm at al., 1998) and direct observation (McKenzie, Sallis, & Armstrong, 1994). Similar tc pedometers, one inherent drawback of the accelerometer is its inability to determine upper body movements for waist or hip-bounded instrument. However, the lates Tritrac RT3 triaxial accelerometers provide X, Y, and Z axes data, which can help tc increase the validity of the instrument. In most cases, accelerometer data can be usec as a criterion measure against other field measures.

Behavioral Observation

Observation is a useful tool, particularly for assessing young children's physica activity because they have not yet developed the cognitive ability to accurately recal detailed information in activity recall or self report surveys. The disadvantages foi behavioral observation are time consuming and the cost of hiring observers for data collection, making it unsuitable for large population study.

There are numerous behavioral observation scales for young children (see

McKenzie, 2002 for detailed review of nine instruments). The four scales briefly described in this paper are The Children's Activity Rating Scale (CARS), System for Observing Fitness Instruction Time (SOFIT), System for Observing Play and Leisure Activity in Youth (SOPLAY) and System for Assessing Children Eating and Physical Activity Behaviors and Associated Events (BEACHES). With the exception of SOPLAY, all scales involve observation of individual child.

The CARS, which was developed by Puhl et al. (1990), has been validated on 3-6 years old children. The scale involves coding activity pattern into either one of the five categories, that is, 1-lying, 2-sitting, 3-standing, 4-walk slow, and 5-fast/strenuous by a minute duration. It was validated by laboratory measure of oxygen consumption.

McKenzie and associates have developed three separate scales for activity observation, which have been further validated by a number of researchers. The scales are System for Observing Fitness Instruction Time (SOFIT, McKenzie, 2000b), System for Observing Play and Leisure Activity in Youth (SOPLAY, McKenzie, 2000a), and Behaviors of Eating and Activity for Children's Health Evaluation System (BEACHES, McKenzie et al., 1991). SOFIT is used solely for structured physical education. It uses momentary time sampling and an interval recording system. It has 3-phase systems requiring an observer to simultaneously code on student activity, lesson context and teacher involvement. The scale was originally validated on 9-10 years old children. From their study of 430 lessons in 24 different schools, McKenzie at al. (2000b) found that boys were significantly more active than girls in free play, game play and skill drill situations. The SOPLAY is a relatively newer scale showing the percentages of children engaging in non-structured leisure-time settings. It uses momentary sampling method and Placheck recording. An observer needs to scan a designated activity area and uses mechanical counters to record the number of children engaging either in "sedentary", "walking", and "very active" activity categories. The scale was validated for 6th and 8th graders. It is the only scale available for measuring physical activity of groups of children. McKenzie et al. (2000a) studied students in 24 middle schools and found that relatively few students visited the activity areas. For those who visited the activity areas, results showed that there were significantly more boys than girls. The BEACHES, an older scale among the other two, was originally designed to assess behaviors of young children at home and during preschool recess. It also uses momentary sampling method to record activity and associated behavior in ten categories, such as environment, eating, child response consequences, and events receiving consequences. The BEACHES has been validated on 4-9 years old children (McKenzie et al., 1991).

Self-Report

Self-report is the most widely used type of physical activity assessment measure. It includes self-administered or interviewer administered recall questionnaire, activity diaries, and proxy reports. The advantages of this technique are that it is suitable for population study at a relatively low cost. However, the main disadvantage of self-report, as in other forms of self-report, is the influence of social desirability for over reporting of physical activity (see detailed review on Sallis & Saelens's article, 2000). Another disadvantage of using self-report is the difficulty of recalling the time and intensity of physical activity, making it unsuitable to be administered to young children due to their inability to recall or record data. Researchers reported high reliabilities of self-report measures for assessing physical activity of youth in the range of 0.60 to 0.98, but lower validity coefficients (e.g. 0.70 to 0.88 for self-administered surveys) (Sallis & Saelen, 2000).

Part II. Author's Research Experience in Physical Activity Measurement of Mentally Retarded Children

My two colleagues in the department, Siu-yin Cheung and Lobo Louie, and I have obtained a grant funded by the Hong Kong Quality Education Fund for the project titled "Physical Fitness Promotion Scheme for Mildly Mentally Retarded School Children in Hong Kong". We started the project in August 2000 and it has been completed in February 2003. This project involved three phases. In the first phase of "Needs Identification", measurements for gross motor skills, physical fitness and activity patterns were conducted for eight local special schools. In the second phase, a half-day seminar was offered to parents, teachers and special school personnel who were interested in promoting active living of children with special needs. The seminar contents included my report on fitness testing results, a speech by a physiotherapist about issues and concerns of children with disabilities during exercise, and a sport training experience dialogue shared between two Hong Kong team young athletes with mental disability. Lastly, a sports medicine physician delivered a short concluding note, urging parents to be responsible and act positively to increase their children's activity and fitness levels. In the last phase of the project, a school-based curriculum on fitness promotion was implemented. The project was concluded by the publication of teaching manuals, which help teachers to increase school children's physical activity.

This project adopted multi-methods in assessing physical activity of school children with mild mental retardation in Hong Kong, which included the use of motion sensors (both triaxial accelerometers and pedometers), observation scales for activity during recess and parents' report on children's physical activity questionnaires. We used the newest Tritrac-RT3 model, triaxial accelerometers, and pedometers (Yamax, SW 200) to collect children's activity during school time in three consecutive normal school days from 9:00 a.m. to 3:30 p.m. In each morning, the Tritrac and pedometer were clipped onto a child's right side and left side of garment at waist level (in line with mid-thigh) and were taken off at the end of the school day. We sealed off both instruments by having tapes wrapping around the covers. Since children may take off the instrument, researcher needs to discard data if there is a very long period of time during daytime without any movement counts. We found no problem in data loading of Tritrac after testing on a total of 32 children with mild mental retardation aged 7 to 12 years old. But we lost an individual data because the child pulled out the Tritrac battery. Apart from those 32 students wearing both Tritrac and pedometers, a group of students from a wider age range (95 more students, aged 6 - 16 years old) wore pedometers only for three consecutive school days from 9:00 a.m. to 3:30 p.m. We lost a total of 19 pedometer data because of instrumentation. These problems include: ten children broke off the seal and hit reset button, two children took off the pedometers, one child lost the instrument while six instruments had run out of battery. Furthermore, researchers need to be aware of the subject's reactivity to the instrument. The children in our study were individuals with mild mental retardation, who were inclined to be curious about the instrument. They broke off the seal of pedometers and looked at the readings. In measuring children's recess behavior, we found that children started to lose this curiosity in their third testing session.

In order to observe children's activity levels during free play periods (time before formal class time and recess periods), we used SOPLAY and CARS observation scales. Since free play space is limited in Hong Kong schools, one observer using SOPLAY was found to be adequate for Hong Kong school environment as children with mental retardation are normally inactive and their most prevalent behaviors were "sitting" and "standing" during free play periods. The CARS provides more information than SOPLAY since it gives individual's activity patterns, rather than group data as the case of SOPLAY. The CARS is simple and easy to use. Children being observed wore cloth strips across their chest for ease in identification. Each observer was assigned to observe three to four children during recess periods. In a school of more than one hundred students, we had four to five observers in an activity area (covered playground). Preliminary data analysis revealed that the prevalent types of activity of these children were "sitting" and "standing" during recess time. These observation data supplemented pedometer readings since the major limitation of pedometers was their inability to record the type, amount, and intensity of physical activity.

In our project, we designed a hundred-items questionnaire to solicit parents' information on the perceived barriers to the child's physical activity and activity patterns of the child during school days and weekends. The length of the questionnaire was our major concern, that is, a compromise between collecting adequate amount of activity data contained in the questionnaire and the possibility of incomplete data from a lengthy questionnaire. Another major concern in questionnaire construction was the sensitivity of wordings.

To conclude our project experiences, we found using a combination of methods: pedometers and observation scales promising as it allows us to obtain useful data about the physical activity pattern of the children of special population during school time. Although in-depth interviews with children with mental disability may not be feasible, in-depth interviews with parents (those having normal intellectual functioning) together with field observations of physical activity during school hours and at home can yield useful information. Therefore, researchers may also consider employing both qualitative and quantitative methods in physical activity research for children of the special population.

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The Qualification and Training System for Adapted Physical Activities in North East Asia

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Introduction

" I wish I could enjoy sports like others, but can I do it? ", " I wish I could learn various type of sports, but can I do it? " These are the hopes and wishes of many people with a disability.

Due to the changes in views and attitude of the public towards the disabled in recent years, major progress has been made with regard to public facilities, education, and social welfare policies. However, based on statistics from a survey on the disabled taking part in sports in Taiwan (1999), only 2.97 % of the total disabled population participates in sport either regularly or irregularly. The major reason for this is the shortage of qualified coaches and volunteers (Lin, 1999).

Research shows that the Egyptians practiced training and sports therapy for the physically injured. Erasistratos (3000 B.C) used activities such as running, horse riding, sailing, fencing, ball games, weight training, etc. as therapy methods for the physically injured. Since the 18th century, chiropractic also actively adopted the concept of therapeutic exercise as a means to heal those with impaired sports functioning. This also indicates that physical sports has played an important role in the field of medical therapy.

The Sports Association for the Deaf was established in 1888 in Berlin, Germany. Since then, various sports associations for the physically challenged have been founded. The number of participants has increased and accordingly, the need for coaches. Special education has received attention since the 1960s, and curriculum design and instruction have played an important role in the special education in schools. Over the years, the area of adapted physical activity has expanded to include sports therapists in hospitals, physical education teachers and athletic (competition) coaches.

There are some activities that the disabled are not able to perform on their own. Therefore, teachers and instructors have to help them to realize their potential through a process of experimentation.

According to Sherrill (1997), the core of adapted physical education should include the following: human development, human relationship and communication, theory of human rights and law, biomechanics, exercise physiology, basic science theory of motor control, basic mental and social theory of self-realization and self-concept, learning motivation and behavior management, measurement and evaluation of study programs, sports psychology, adaptability of adapted physical activity, sports and games, dances, water sports and various related activities, basic knowledge of creativity and individuality, the classification of various sports for the disabled and the adjustment and prototype of equipment, rehabilitation, physiotherapy, music therapy and other therapy methods.

Therefore, a person who wishes to be a teacher, instructor, coach or sports therapist of adapted physical activity, has to acquaint him or herself thoroughly with professional knowledge in various areas.

Japan hosted the games for the physically disabled in Tokyo in 1951, and also established the Sport Association for the Physically Disabled in 1961 (Nakagawa, 1976). Korea has established The Korean Special Education Research Society in 1971, and also a special faculty in 1998 (Kin, 1995). Taiwan has started to introduce special physical education in schools in 1974. Although progress and focus points are different in each country, what has been gleaned can still serve as a benchmark for talent developing policies, methods and the meaningful exchange of information.

This research is a comparative study of the talent development contents for adapted physical activity, and the qualifying regulations and policies for curriculum design in East Asia. The results of this research hope to lead to mutual understanding and improved participation in international exchange programs by east Asian countries.

Purpose

The development of sport for the disabled has been inextricably linked to the work done by professionals in the following fields:

1. Medical treatment and medical rehabilitation sports,
2. Adapted physical education sports and
3. Lifetime sports (including community sports, fitness sports and competitive sports).

This is a comparative study of four east Asian countries namely Japan, Korea, Mainland China and Taiwan. The aims of this study are to:

1. investigate the sports facilities in the countries mentioned above,
2. investigate the instructor preparation programs of sport for the disabled,
3. assess the system of national qualification and
4. determine how the names of occupations vary from country to country.

Provision was made in the items of the questionnaire for the uniqueness of each country and its circumstances.

Method

The process of this research includes a questionnaire and a review of the literature. The cooperation of local as well as international professionals was requested. They were asked to complete the questionnaire and to contribute any literature concerning their specific country and relevant to this research. This research was conducted from 1st April 1998 to 30th April 1999.

The questionnaire item contents:

1. Are there any sports facilities for the disabled in any of the hospitals in your country?
2. What are the official names of the occupations of those working in the following fields: medical treatment, medical rehabilitation sports, adapted physical education sports, and lifetime sports?
3. Is there any official qualification system in your country?
4. What is the name of the qualification and the authorized organization or relevant government department?
5. What is the Name of the institution(s) that offer preparatory programs?
6. What is the prerequisite for attending lectures?
7. What are the curriculum contents and what is the duration of the course?

8. What is the structure of related government efforts for the promotion or supervision of sports for the disabled?

This research has been updated on a continuous basis to keep abreast with new data. The cooperator list is as follows:

Japan area:

Prof Kusano Katsuhiro, Miyazaki University.

Prof. Fujiwara Shinichiro, President of Technical Committee, Disabilities Sport Society.

Korea area:

Prof. Hong Yang Ja, Department of Sport and Leisure science, Dean of Human Movement and Performance College.

Prof. Kim Ki Hong, Department of Social Physical Education, Yong-In University, Korea

Mainland China area:

Prof. Chan Ning Sheng, Ryou Ning Normal University.

Mr. Chia Yung, Secretary General, China Federation for the Disabled.

Results

From Table 1, we see that there are sports facilities in hospitals in Japan and Korea. Facilities for the disabled and those for the general public are separated only in Japan. Each community for the disabled has one facility. In 1998 there were a total of 102 facilities for the disabled in Japan. The disabled in Korea, Mainland China and Taiwan use facilities for the general public when doing sports.

Table 1: Sports Facilities for the Disabled

Country / Kind of facility	Japan	Korea	Mainland China	Taiwan
Sports facilities for rehabilitation in hospitals	+	+	-	-
Public sports facilities for lifetime sports	+	+	+	+
- Some sports facilities that fulfill the needs of the disabled	+	+	-	+
- Facilities for the disabled separated from facilities for the general public	+	-	-	-
- Facilities for the general public shared with the disabled	+	+	+	+

Table 2 is a comparison of the four countries with regard to the name and administration of certification of instructors of various sports activities for the disabled. In the fields of medical treatment and rehabilitation sports in hospitals Japan is the most advanced. The National Rehabilitation Center for the Disabled (NRCD) was established by the Ministry of Health and Welfare in 1979. The NRCD integrates all work done with the physically disabled, and those suffering from visual, speech and hearing disorders. The center in Tokyo which has grown to include a training center, hospital, research institute and college, also falls under the NRCD. The work done at this college can hardly be overestimated. In 1991, a course in rehabilitation gymnastics was introduced, making professional personal training available for the first time. After graduating from the initial two-year program in rehabilitation sports education, candidates may enroll on the national sports instructor for the disabled course (advanced level), at the Japan Sports Association for the Disabled. After completion candidates may apply for positions at hospitals, sports centers or other facilities for the disabled.

Table 2: The Name and Administration of Certification of Instructors of Sports Activities for the Disabled (Lin M.H. rearrange, 2002)

	Japan	Korea	Main China	Taiwan
Medical treatment in hospitals	Rehabilitation Sports instructor	Recreational therapist	PT nurse OT doctor	PT OT
Medical rehabilitation in hospitals	Rehabilitation Sports instructor	Recreational therapist	PT nurse OT doctor	PT OT
Administrative of certification	The National Rehabilitation Center College for the Disabled	Entrance the university or college get a certification		
Adapted physical education in schools	Teacher of special education Teacher of physical education	Teacher of special education Teacher of physical education	Teacher of special education Teacher of physical education	Teacher of special education Teacher of physical education
Administrative of certification	Ministry of Education and Science	Ministry of Education	Ministry of Education	Ministry of Education
Community sports Competitive sports	Teacher of physical education Sport instructor for the disabled National Sport instructor for disabled - elementary level - intermediate level - advanced level Sport Coaches	Teacher of physical education Sport instructor for for disabled - elementary level - intermediate level - advanced level Sport Coaches	Teacher of physical education Sport Coaches	Teacher of physical education Sport Coaches for the disabled - class A - class B - class C
Administrative of certification	Japan Sports Association for the Disabled	Korea Sports Association for the Disabled	China Sports Association for the Disabled	Chinese Taipei Sports Federation for the Disabled

Medical treatment and rehabilitation sports in hospitals are available In Mainland China and Taiwan. These fields are staffed by physiotherapists and occupational therapists. As far as the teaching of adapted physical education in schools is concerned, teachers of special education or teachers of physical education (but working in the field of adapted physical education), are professionally qualified. These teachers as a rule however do not hold degrees in adapted physical education. The reason for this is that a first degree in adapted physical education as part of a national training system is not available in any of the four countries that were researched for this paper.

In addition to Japan, Korea and Taiwan, Mainland China has also started to introduce programs in adapted physical activity at the departments of special education and physical education of some of its universities and colleges.

Since 2000, physical education teachers in Taiwan may also obtain a master's degree in adapted physical education from the National Taiwan Normal University. Candidates attend classes over a four year period during the summer vacation months of July and August. Moreover, the Ministry of Education has entrusted the Physical Education Development and Research Center (National Taiwan Normal University), to hold 8-10 conferences and practice courses per year for teachers of adapted physical education. A certificate is awarded to attendees.

Tokyo hosted the 1964 Paralympics and Seoul in 1988. Beijing hosted the 6th PESPIC games in 1994. It is evident from this research that these countries benefited enormously in that the development of competitive sports activities was greatly accelerated by these events.

The Japan Sports Association for the Physically Disabled introduced a one week training program in 1996. It has since been refined and perfected into a training program for competitive sports and community sports. The program offers training for physical education teachers, sports instructors for the disabled and sport coaches. Certificates are awarded on three levels: elementary level, intermediate level and advanced level.

The Korea Sports Association for the Disabled (KOSAD) and The Chinese Taipei Sports Federation for the Disabled have training programs and also award certificates to attendees. These organizations however lack academic infrastructure and a strict examination system. They also do not have courses at regular intervals. In Mainland China, school teachers of physical education and competitive sport coaches are responsible for the adapted physical education of students and the training of athletes to participate in competitive sports.

Table 3 shows the education course for rehabilitation sports instructors in Japan. The college at the National Rehabilitation Center offers a Course in rehabilitation gymnastics only teachers and with a first degree in physical education may apply for admittance. Candidates must complete a basic curriculum, a specialized basic curriculum and a specialized curriculum over a period of two years. The course has a prominent medical and 50 % of the character curriculum contents are medical related.

Table 3: The Education Course for Rehabilitation Sports Instructor in Japan Sports Association for the Disabled

Title of program	Rehabilitation gymnastic
Prerequisites for admission	Health and physical education teachers
The number of years set for a program	2 years
Capacity	20 persons
Curriculum (1) Basic curriculum (255 hours)	rehabilitation theory, welfare science theory, intelligence management, statistics, sports psychology, motor development, psychology of the disabled, etc.
(2) Specialized basic curriculum (825 hours)	anatomy, physiology, kinematics, pathology, rehabilitation medicine, sports pathology, clinical medicine, clinical psychology, physical therapeutic theory, artificial limbs; supplementary instruments, therapeutic recreation theory, etc.
(3) Specialized curriculum (305 hours)	principles of physical education, rehabilitation sports exercise, rehabilitation sports management, prescribed training I-III, technique of adapted physical activity, aging process, competitive sports guide, practices, etc.

From Japan The National Rehabilitation Center for the Disabled Homepage (2002).

Table 4 shows the education course for adapted physical education teacher in Korea and Taiwan. In Korea, the Yong - In University's Department of adapted physical education was established in 1993. This is the first and only department of its kind to train teachers in sports for the disabled. In 1997 Korea had 106 departments of physical education. Forty-two of these departments offered course in adapted physical education. The course at Yong - In remains the most prestigious because it allows graduates to work in at least four specialized areas of adapted physical education.

Table 4: The Education Course for Adapted Physical Education Teachers in Korea and Taiwan (Lin M.H. rearrange, 2002)

		Korea	Taiwan
		Yong-In university (1993) Department of Adapted Physical Education	National Taiwan Normal University (2002) Master course in Adapted Physical Education
Prerequisites for admission		Graduate from high school	Teacher of physical education
The number of years set for a program		4 years	Summer course over 4 years
Academic degree		Bachelor of Adapted Physical Education	Master's of Adapted Physical Education
Curriculum	Step 1: (24 credits)	principles physical education, special education, human anatomy, education psychology, learning disability, safety education, 5 kinds of sports.	**Required course** (21 credits) research method of adapted physical education, pedagogy of adapted physical education, measure and statistics, research of psychology and education, topic seminar of special education, behavior modification, practice.
	Step 2 (22.1 credits)	biomechanics, physiology of exercise, adapted physical activity theory, behavioral model theory, speech therapy, psychology and sociology of sport.	
	Step 3 (37 credits)	sports medicine, physiology of disabled, practice, prescription of exercise, psychology for the disabled, physiotherapy, exercise training theory, psychology of hearing disorders, winter sports, APE research method, 2 kinds of sports.	**Elective course** (13 credits) psychology and sociology for the disabled, competitive games and management, clinical method for the disabled, rehabilitation therapy, medical treatment, physical activity of elderly, motor development and motor learning.
	Step 4 (27 credits)	motor development, motor learning, assessment, statistics, neurophysiology, manual method, recreation, 2 kinds of sports.	

In Taiwan a master's degree in Adapted Physical Education was introduced in 2000. Candidates may join every second year and classes are attended during the summer vacation month of July and August over a four year period. Only teachers of physical education at junior high schools and above may apply for admission. The curriculum focuses exclusively on special education and practice. The National Lin-Kou college of physical education is in the process of establishing a department of adapted physical education. The Taiwan government attaches great importance to special education and has earmarked funds for the development of adapted physical activity.

Table 5 shows the curriculum for sports instructor for the disabled in Japan Sport Association for the Disabled. The curriculum has 8 components. These 8 components are introduced on 3 levels: an elementary level, an intermediate and an advanced level. The components include sports management (18 hours over 3 levels), sports and physical mechanism (21 hours over 3 levels), sports psychology (5 hours over 3 levels), sports guidance (22 hours over 3 levels), understanding the disabled (28 hours over 3 levels), sports medicine (12 hours over 3 levels), sports practices (27 hours over 3 levels), and teaching practices (18 hours over 3 levels). The duration of the course totals 151 training hours over 3 levels.

Table 5: The Curriculum for Sports Instructor for the Disabled in Japan Sport Association for the Disabled (1999)

Curriculum	Elementary level	Intermediate level	Advanced level
Sports management (18)	Introduction of welfare (3)	Outline of sports games (1), Training of sports instructors (2), Introduce yu-ai PIC (1)	Management of facilities (3), Welfare and sports development for the disabled (3), Planning and management of competitive sports games (3), Introduction of facilities (2)
Sports and physical mechanism (21)	Health and fitness (2)	Health management for the Elderly (2), Introduction of physiology (4), Growth and development (2)	Understanding of the diseases of life styles (2), Sport prescribed for the Internal disorder (3), Test and measure (2), Introduction of biomechanics (2), Sports for woman (2)
Sport psychology (5)	Introduction of psychology (3)		Primary of coaches (2)
Sports guidance (22)	Safety management (2), Introduction of recreation (2)	Basic training theory (3), Attention point for training the physically disabled (3), Attention points for training the mentally retarded (2), Sports rulers for sports games (2)	Sports and nutrition (3), Therapeutic recreation (3), Competitive sports rulers for international sports games (2)
Understanding the disabled (28)	Introduction of the disabled (2), Introduction of recreation (2)	Particulars for the disorder (I) (14), Supplement for the disabled (2), Functional classification (2)	Introduction of wheelchair (2), Particulars of thedisorder (II) (2), Functional classification of the international sport games (2)
Sports medicine (12)		Sports injury (3), Emergency treatment (4)	Medical check (3), Doping (2)
Sports practices (27)	Sports experiment For the disabled (8)	Practices of weight training (3), Practices of competitive sports games (11), Practices of recreation (2)	
Teaching practice (18)			Presentation
Hours (151)	24 hours	66 hours	61 hours

Table 6 represents the course for sport coaches for the disabled in Japan. This is a 3 year course with 6 components in 3 categories (categories A, B and C). Every category entails 30 lecture hours. The categories may be completed in any order. The duration of the course totals 90 hours in 3 categories. Only qualified sports instructors for the disabled who are registered with the Japan Sports Association for the Disabled may apply for admission. Candidates must also present a letter of recommendation from a competitive sports association or the Japan Sport Association for the Disabled.

Table 6: The Curriculum for Sports Coaches for the Disabled in Japan Sports Association for the Disabled (1999)

Curriculum	A	B	C
Sports management	The aim of coaches (3)	Sports for the Disabled (3)	Issues of attending the international sport games (3)
Sports psychology	Psychology for coaches (6)	Issues of team games (3)	Mental training (3)
Training theory	Body motion (4), Planning of training (4), Technique guidance of competitive sports (6)	Sports test and measure (4), Training of growth period (2), Technique guidance of competitive sports (6)	Training and fatigue (3), Food and drink intake method (4), Technique guidance of competitive sports (6)
Sports medicine	Sports injury and emergency (4)	Health management for athletes (3), Health management for athletes with disorders (3)	Health management for athletes with disorders (3), Prescribed training (4)
Sports practices	Massage, tapping, stretching etc. (4)		
Practices of different sports for competitive	(3)	(6)	(7)
Hours (90)	30 hours	30 hours	30 hours

Conclusion

The result of this research shows that Japan has a fully developed qualification and training systems. In 1999 there were 8,959 sports instructors for adapted physical activity. In Korea courses in adapted physical education are offered at 42 university departments.

Taiwan is doing every thing in its power to increase the number of disabled persons of all ages who do sport on a regular basis. Every person has the inalienable right not only to education but also to sports. It is hoped that the countries of North East Asia will in the near future take their place amongst the leading nations in the field of adapted physical activity.

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Paralympic Sports in Hong Kong: Past, Present and Future

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Paralympic Sports

Sports in the one form or another for amputees, blind and deaf had a long history backdating to as early as the late 19th Century.

Organized competitive sports among large groups of Disabled is relatively new development in the 1940's. Among them the paraplegics who suffered from spinal cord injuries led only a short life of 2-3 years due to bedsores and/or the destruction of kidneys.

Entrusted by the British government Sir Ludwig Gutmann opened a spinal injuries center at the Stoke Mandeville Hospital and he was the first one to introduce sports as a mode of rehabilitation to the Disabled persons, with a hope to overcome their disabilities, regain self-confidence and most important of all, re-integrate them into the main stream of society.

The sport programme, which was first rehabilitation in nature quickly became recreational among the Disabled and very soon developed into organized competition. Sir Ludwig was once so ambitious that he wanted to link the first Stoke Mandeville Games to that of the London Olympic Games in 1948. The Games became international since 1952 when some Dutch archers joined in the competition with their British counterparts. International Stoke Mandeville Games (ISMG) held every year in Stoke Mandeville since 1952, except for the years of the Olympics.

The first international Games of the Disabled were held in the year of Olympics was the one hosted in Rome of Italy in 1960, which was also known as the 9th ISMG.

The second such Games for the Disabled was held in Tokyo of Japan in 1964. The chairman of the Tokyo Games Organizing Committee adopted the name of the Games as Paralympics, meaning that the Games was parallel to that of the Olympics. The word "para" in Latin means also "with", that is, the Games that follows the Olympics.

Different names had been used for the games in different times since and it was not until the 1988 Games hosted in Seoul of South Korea that the name Paralympics was officially adopted. It has also become a rule that the city which hosts the Olympics must also host the Paralympics as well since that year.

The Paralympics, as up to 1972, were only for wheelchair events and was managed by the International Stoke Mandeville Games Federation (ISMGF). When Blind and Amputees, later the Cerebral palsied were respectively included in 1976 and 1980, joint effort were required from the various governing federations, namely the ISMGF, International Sports Organization for the Disabled (ISOD), International Blind Sports Association (IBSA), Cerebral Palsy International Sport and Recreation Association (CP-ISRA) and International Sports Federation for Persons with Intellectual Disability (INAS-FID). This led to the formation of the International Paralympic Committee (IPC) in 1989, an organization similar to the International Olympic Committee (IOC) for the Able-bodied. IOC has had a close relationship with IPC and helps to market Paralympics as well as granting financial support to IPC. All disability groups, including the Mentally Handicapped are under the IPC. The IPC logo consists of 3 Tae-Geuks, one in green, red and blue, symbolizing the most significant components of the human being: Mind, Body, Spirit.

Hong Kong
PAST (1972 to 1989 ~ Foundation and Consolidation Years)

Hong Kong, being a British colony, adopted sports as a mode of rehabilitation in the 1960's. In those days sports were considered something only for those who could afford to waste time playing, one could imagine how difficult was it to introduce sports to Disabled persons. The targeted groups were patients in rehabilitation institutes and students in special schools. In fact, most of them has never had an opportunity to play sports before. The view of the general public towards introducing sports to Disabled was not favourable as they felt that that was something too much for them. As a matter of fact, life for the Disabled, in particular the paraplegics in the 1960's and 1970's were just miserable in that they became a burden to their family. The traditional negative attitude and the inaccessibility in most venues and transportation etc. were all to their disadvantages. Many of them chose not to face such hardship and committed suicide.

Teams were sent for overseas games were mainly to widen the scope of local Disabled and encourage them to be independent and eventually lead a normal life.

The visit of the US Paralympic Wheelchair Basketball team on their way back to the States after participating in the 1964 Tokyo Paralympic Games, and that of the New Zealand paraplegic Sports Team which stopped over in Hong Kong after competing in the 1970 ISMG were considered landmarks for the development of Disabled sports in Hong Kong. The visit of the New Zealand team was timed to coincide with Hong Kong's first Sports Day for the Physically Disabled. The Hong Kong Sports Association for the Physically Disabled (SAP) was established in 1972 after the second Sports Day was held in 1971. The Hong Kong Sports Association for the Mentally Handicapped (SAM) was established in 1976. These enormous development were all because of the vision of one man, Sir Harry Fang, the founder of Disabled Sports in Hong Kong.

While Mentally Handicapped athletes did not compete in Paralympics until the 2000 Sydney Games, the Physically Disabled first took part in the 1972 Hiedelberg Paralympics. We had never dreamed of winning a silver and a bronze medal in that Games. We participated in every Paralympic Games since.

In the early years our participation in Paralympics was merely to provide a goal for our athletes to aim at while engaging in the practice of sports. Though our outstanding performance over the years did not arouse much of the attention of our society, it did serve some publicity in the field of rehabilitation and among the Disabled community in Hong Kong.

The motto "It is the Ability, and not Disability that Counts" has gone deep into the heart of those who have been involved in one way or another in the field of sports for the Disabled, the volunteers, the Disabled themselves and their friends and relatives, and perhaps it has also helped to attract donations and regular funding supports over the years.

PRESENT (1990 to 2000 ~ The Years of Pursuit for Excellence)

Hong Kong athletes established the first world record in swimming during the 3rd Far East and South Pacific Games in 1982 in Hong Kong. The first Paralympic gold medal was won in Fencing in 1984 Paralympics held in U.K. Our wheelchair table tennis team, comprising only 6 players ranked second in the 1992 Barcelona Paralympics among the 87 nations/territories competing in the sport. Our fencing team ranked first in Fencing in the 1996 Atlanta Paralympics, and so was the table tennis world champion for the Mentally Handicapped category as well as the world records by our Cerebral Palsied athletic team in 100m, 200m, 400m, Long Jump and 4x100m relay races.

All those tremendous success was not noticed until Hong Kong won the first Olympic medal, a gold one, in the history of Hong Kong's Able-bodied sports. When the wind-surfer, Lee Lai San returned to Hong Kong and greeted with great triumph, people started to ask why our medal Paralympians who had brought more glory to Hong Kong over the years were not treated the same. Similar treatments, including the issuance of the first-day cover, were then arranged.

For the first time a team of Mentally-Handicapped athletes were also included in the Hong Kong delegation to the Sydney Games and they performed just as good as the Physically Disabled counterparts by winning a gold and a silver medal.

At the 2000 Sydney Games, our athletes won a total of 8 gold, 3 silver and 7 bronze medals, placing Hong Kong to the 21st position among the 127 nations/territories which were competing in the Games.

All these outstanding performances would be impossible if there were not sufficient funding to support the athletes participation in so many overseas competitions and trainings. For the 12 years between 1989/90 and 2000/01, we had spent an amount of $18,151,334 for a total of 154 international events and most of them were ranking or qualifying events needed to gain entry to the subsequent Paralympics. It is worthy to note that for the 1999/2000, the year leading to the Sydney Paralympics, we had sent altogether 25 teams for overseas events. One can imagine the tremendous amount of workload involved and the tight schedules for our athletes and coaches.

The success of disabled athletes make them more confident in their other aspects of daily life as well. The society has become to realize their ability and offer them more opportunities in addition to the recognition in sports that they well deserve.

FUTURE (From 2000 Onwards ~ Change from Amateur to Professionals)

When considering the ever-increasing competitiveness all over the world, which is very much due to the change of athletes from amateurs to professionals or at least to semi-professionals, and the relatively less support from our government, Hong Kong has already reached its summit. Any further advancement will need a much bigger strike in the support to our athletes, including making them as well as their coaches full time in the same way as those of many other nations/territories. Lack of new bloods to join in is another area of concern to the future development. The recently released Sports Policy Review has also devoted a chapter to Disabled Sports and one of the proposals is to employ more full time coaches. Moreover, a coordinating committee has also been suggested in the Review as to coordinate all school sports, including those Disabled students in normal schools. It is hoped that SAP could make use of these suggestions and reach out to more talented Disabled sportsmen/women in the near future.

The granting of 50 millions by the Hong Kong government to set up the Paralympian Fund is a good sign. It aims to provide more funding support to existing athletes as well as to prepare them for retirement after their competition life is over. Yet it is still far from sufficient if our athletes are to remain amateur, having to carry with them the burden of studies or work. To encourage more young novices a FESPIC Junior Games is being planned to launch in Hong Kong in late 2003. It is hoped that through these games more youngsters like Ben Cheung, So Wah Wai, Fung Ying Ki and Lai Wai Ling be spotted in the near future.

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The 1st staff of SAP and also volunteer serving Disabled sports in Hong Kong for 30 years.

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The Attitudes of Parents of Children without Disabilities on Sport Socialization of Students with Disabilities: Cross Cultural Comparison between Korean Parents and American Parents

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Introduction

Socialization can be defined as an ongoing process by which individuals learn about their environment and/or culture, acquire the social characteristics of the culture, and engage with other members of the culture (Coakley, 1998). Based on this definition, because individuals with and without disability are socialized into culture of sport, sport participation is a critical component of socialization.

When evaluating socialization in sport, the literatures often have focused on social agents such as parent, family, and teacher, who influence the environment for sport participation (Sherrill, Rainbolt, Montelione, & Pope, 1986; Zoerink, 1992). Especially, during the childhood years, parental attitudes toward sport socialization appear to be a critical factor in making decisions about future participatory behaviors (Brustad, 1992; Weiss, Ebbeck, & Horn, 1997). For example, if parental support for sport participation is conveyed, children are more likely to become socialized into sport, and are more likely to become active participants than those with parents who have negative attitudes regarding sport participation.

Over past decades, several researchers have analyzed the attitudes of parents having their child with disabilities participating in sports through educational institutions, physical activity programs or Olympics with children without disabilities, and reported that their positive or negative attitude plays a role in sports socialization of children with disabilities (Winnick, 1985; Williams, 1994). However, most studies have assessed only parents of children with disabilities, and they have not addressed a comparison of cultural perspectives regarding the attitude of parents of children without disabilities. Therefore, the purposes of this study are to determine how parents of children without disabilities influence the sport participation (i.e., sports socialization) of the children with disabilities, and to compare Korean parents' and American parents' attitudes toward sports socialization of children with disabilities.

There are five hypotheses and two research questions for this study. The hypotheses are: (a) Fathers of children without disabilities in both countries have more negative attitudes about children with disabilities participating in physical activity programs with their children than mothers have; (b) Korean parents of children without disabilities have more negative attitudes about children with disabilities participating in physical activity programs with their children than American parents have; (c) Parents in both countries who have low education level have more negative attitudes about children with disabilities participating in physical activity programs with their children than parents with high education level have; (d) Parents of children without disabilities who experienced special education and mainstreamed classes during their life will have more positive attitude regarding sport socialization of children with disabilities than those who did not experience special education classes; and (e) Parents who have a close family member or friend with disabilities have more positive attitudes about children with disabilities participating in physical activity programs with their children than those who did not have it. The research questions are: (a) What will be the best place for education for children with disabilities?; and (b) Do you think that traditional thoughts or superstitions in each country would interfere with positive attitudes for the disabled?

The Situations of Special Education Services in Korea and America

Generally, educational goals for students with disabilities are to increase the individual's personal independence, enhance opportunities for participation in the community, and prepare for a successful future in society (Westling & Fox, 1995). In accordance with the educational goals, inclusion has emerged as the term of choice for the practice of mainstreaming or integrating students with disabilities into neighborhood schools and regular classes, and in America there is strong support for inclusion (Block & Zeman, 1996; Friend & Bursuck, 1996; Lipsky & Gartner, 1992).

Despite the legal mandate of the past decade for integrating disabled students in public shool physical education and athletic programs in both America and Korea, if one had to classify special education in Korea, it would become closer to segregated education than to integrated education. To understand cultural differences between America and Korea, an explanation about the situations of Korean special education services will be provided.

In Korea, elementary education is free and compulsory for children ages 7 through 12. Secondary education consists of two 3-year cycles. Most Korean children usually attend public schools. Special education for elementary school age children is also free, but not compulsory. Korean special education services are provided mainly in these special schools in full-time, self-contained special classes. These schools are divided into five types: schools for the mentally retarded, the visually impaired, the physically impaired, the hearing impaired, and the emotionally disturbed. However, a number of residential facilities and clinical centers are provided as an alternative for students with sensory impairments or for those with multiple disabilities. Home-schooling is also an option for all children with disabilities (Kim, 1995).

Seo, Oakland, Han, and Hu (1992) stated that, at the national administrative level, Korea lacks a special education director in its Ministry of Education. Consequently, school principals and special education teachers often make decisions with little guidance or policy from government officials. Indeed, most regular schools are not familiar with special education regulations and practices. According to the review of Song and Yu (1990), teachers in regular classes have had little or no special training in dealing with various students with disabilities, and only have received general training and have covered the curriculum in short-term courses. They also stated that this is one of the reasons why it is difficult to solve the problem of integration.

Also, up until now, regular teachers usually do not want children with disabilities staying in their classrooms because they do not have the necessary qualifications for working with children with disabilities. Further, they believe that children educated in a segregated educational system have more benefits than children educated in an integrated setting. They prefer the segregated institutes with facilities suitable for students with disabilities (Kim, 1988). Furthermore, it is noted that some Koreans still believe that if a special school is located near their house, they are destined to have bad luck.

Methods

Subjects

Subjects for this study were 30 parents who did not have a child with disabilities. At least one parent in each subject's family was enrolled in Michigan State University at the time of the study. The subjects in the sample were comprised of 15 Korean parents (7males and 8 females) and 15 American parents (7 males and 8 females). The 15 Korean parents have lived in America more than two years. 27 % of the subjects in both countries had family members or close friends who had a special education or disabled child. Also, about 34 % from subjects in both countries had experienced special education class involvement. Consent to participate in this study was assumed after the subjects read the consent form of the questionnaire paper.

Instrumentation

A questionnaire and an interview technique were used for this study. The questionnaire was designed to address the hypotheses in this study (i.e., quantitative questions), and an interview was developed to address part of the explanatory research questions for this study (i.e., qualitative).

The questionnaire was divided into two parts: (a) five of the questions on the survey concentrated on demographic information; (b) six questions used a five-point Likert response scale and were concerned with parent's attitudes about sport socialization of students with disabilities. These six questions were based on the previous research's questionnaire (Kozub & Porretta, 1998) which dealt with coaches' attitudes, and was modified in consideration of parental subjects. Then, a professor reviewed and approved the questionnaire for content validity.

The interview consisted of open-ended questions grouped into four general areas: (a) American and Korean parents' general attitudes about people with disabilities; (b) general information about the subjects' experiences regarding working or studying with people with disabilities, or their knowledge and observations of family members of close friends who have children with disabilities; (c) parents' attitudes regarding traditional thought, or superstitions in each country (e.g., do you agree or disagree with this?); and (d) impact of cultural, educational, political, and social background on sport socialization of children with disabilities in each country.

Procedure

After receiving permission of parents, the questionnaires were administered to all 15 Korean parents and 15 American parents on campus (classroom, library, or cafeteria). At that time, parents were randomly asked to arrange an interview for a later time if they were interested in participating further in the qualitative part of this study. As a result, 4 Korean parents (2 males and 2 females) and 4 American parents (2 males and 2 females) participated in the interviews that were conducted on campus at the university. All interviews ranged in length from 15 minutes to 20 minutes. It is noted that most interviewees wrote their responses to each question. The questionnaires and interviews were administered over a month period during fall semester 2000.

Data Analysis

The collected data were coded to SPSS. At first, descriptive statistics, including means and standard deviations, were used to describe the demographic levels for each group (e.g., gender, level of education, and experience of special education). Second, the t-test and ANOVA, to analyze the hypotheses posed in the introduction section in this study, were used at an alpha level of .05. Third, the notes from the interview were categorized in terms of research questions posed in the introduction section in this study.

Results

Quantitative and qualitative research strategies were used to analyze the attitudes of parents about sport socialization of children with disabilities. First, the results for quantitative research are presented according to the hypotheses tested. Then, the following are the analyses of qualitative research based on research questions.

Quantitative Results

Hypothesis 1. An independent sample t-test was used to compare the attitudes of fathers with those of mothers from both countries. The t-test results showed that fathers of children without disabilities in both countries have similar scores on 6 questions about parents' attitudes to mothers of children without disabilities in both countries. Therefore, the data did not support Hypothesis 1.

Hypothesis 2. An independent sample t-test was used to compare the attitudes of Korean parents about sport socialization of children with disabilities with those of American parents. The t-test results showed that Korean parents of children without disabilities have similar scores on 5 questions about parents' attitudes to American parents of children without disabilities. However, Korean parents of children without disabilities have significantly different scores on one question (i.e., question 8 of questionnaires; see Appendix I) about parents' attitudes from American parents of children without disabilities, $t(28) = 3.54$, $p = .00$. Therefore, the data partially supported Hypothesis 2.

Hypothesis 3. An ANOVA was used to analyze whether the different educational levels of parents affect the attitudes toward sport socialization of children with disabilities.

The results indicated that on 6 questions there were not significantly different attitudes according to the educational level of parents. Therefore, the data did not support Hypothesis 3.

Hypothesis 4. An independent sample t-test was used to analyze hypothesis 4. The t-test results showed that parents who experienced special education and mainstreamed classes during their life have similar scores on 5 questions about parents' attitudes to those who did not experience special education classes. However, parents who experienced special education and mainstreamed classes during their life have significantly different scores on one question (i.e., question 8 of questionnaire; see Appendix I) about parents' attitudes from those who did not experience special education classes, $t(28) = 2.35$, $p = .029$. Therefore, the data could partially support Hypothesis 4.

Hypothesis 5. An independent sample t-test was also used to analyze hypothesis 5. The t-test results showed that parents who have a close family or friend with disabilities have similar scores on 5 questions about parents' attitudes to those who did not have it. However, parents who have a close family or friend with disabilities have significantly different scores on one question (i.e., question 8 of questionnaire; see Appendix I) about parents' attitudes from those who did not have it, $t(28) = 2.37$, $p = .031$. Therefore, the data partially supported Hypothesis 5.

Qualitative Results

Research question 1. The first research question addressed what will be the best place for education for children with disabilities? and what is the relationships of culture on attitudes and educational practices? From the interview of parents, most parents in both countries have positive responses to inclusion of the people with disabilities. For example, one of the parents said that "we should place students with disabilities in educational settings as similar to those of non-disabled students as possible." However, some Korean parents are still concerned about the effectiveness of education of their children who do not have disabilities, because of the educational systems of Korea which pursues segregated education for the disabled. Especially, two Korean parents summed up a common concern:

"I think the disabled should stay in segregated schools. I prefer them to stay in special classes. I think if someone has a problem of mental or physical ability, he needs one-on-one instruction. I think that even though, now, we develop perspectives of special education, government or school administrators did not enlist many special teachers because of their financial problems" - Parent 1

"I think that, in Korea, only few universities offer the special education major. I never see the special educators in the regular schools in Korea. I think because it does not have enough qualified specialists to allow public schools or regular classes to their own program, segregated settings will be beneficial for the disabled." - Parent 2

In addition, based on the researcher's past experience, it is noted that "I had never seen my classmates with disabilities in Korea." In fact, it was hard for me to imagine studying or working with a disabled person, because the educational system in Korea (i.e., current cultural situation in Korea) does not allow this to happen.

Meanwhile, three American parents support that children with disabilities would continue to receive integrated services, and "they are also similar to most others, such as my child, in most respects." Especially, one of them carefully described American's culture background for me. She said that "various agencies of government were concerned with programs of people with disabilities, and they were strengthened to meet the needs of people with disabilities. The federal government sharply increased its aid to special education. From the 1980s, in America, there was greatly increased emphasis on developing social and recreational programs for children and youths with disabilities in both institutional and community settings."

However, it is noted that one American had a different perspective. He said that "I think culture has a strong influence on attitudes toward the disabled, which in turn affects educational practices. American culture values health, physical appearance, the ability to perform athletically, which is in conflict with many disabilities. Because disability often conflicts with what we consider of value in individuals, we are uncomfortable around disabled people, and prefer to not have contact with them. This leads to isolation, such as special schools or classrooms, and lack of involvement with people with disabilities."

Research question 2. The second research question asked do you think that traditional thoughts or superstitions in your country would interfere with positive attitudes for the disabled? As mentioned in the literature review section, in Korea, there are still many traditional misconceptions about people with disabilities. For example, many families will attempt to conceal family members who have disabilities from outsiders. If a visitor comes to the house, children with disabilities will be sent into a back room. Also, parents may not go out into public with a disabled child. In other words, parents or relatives shelter their children with disabilities excessively, and they are very much concerned about the rejection by others. Of course, this depends on the family. Some families will not be ashamed, but still many families will try to keep others from seeing a family member with disabilities. All Korean parents interviewed indicated that such traditional thoughts and superstitions have interfered with positive attitudes toward the disabled. Actually, one of the Korean interviewees told his experience. "I got married about 5 years ago...... My wife's aunt has a mentally disabled daughter. However, until 3 three years after our marriage, I did not find out this, and I have not still met her yet." Therefore, he advocated that this stigma or misconception of disabilities would interfere with positive attitudes for the disabled. Meanwhile, all American parents also agree that the stigma of disabilities would interfere with positive attitudes for the disabled. Especially, one of them said that "the results of this stigma of disabilities is discrimination. So, the various forms of discrimination are often similar to that experienced by many other minorities in American culture."

Discussion

The findings of this study indicate that the differences of parents' gender and of education levels of parents did not affect the parental attitudes toward sport socialization of children with disabilities. However, the Korean and American parents have partially different attitudes about sport socialization of children with disabilities. More specifically speaking, the American parents have more positive attitudes about integrated educational systems for children with disabilities than the Korean parents, though parents in both countries pursue the integrated educational settings and agree with the benefits of inclusion.

In addition, the findings of this study show that the parents who experienced special education and mainstreamed classes during their life have more positive attitudes about integrated educational systems for children with disabilities. The reason why the result is important is that, among the subjects in this study, the American parents have more experience of special education class involvement than the Korean parents, though subjects in both groups do not have significantly different levels of education. Therefore, the researcher believes that this hypothesis also can explain the basic difference between the Korean and American parents. Actually, in Korea, there are more than 100 universities (not including colleges), but less than 10 offer a special education major (Song & Yu, 1990).

Furthermore, the findings of this study indicate that parents who have a close family or friend with disabilities have more positive attitudes about integrated educational systems for children with disabilities. This result also can infer to Korean and American parents' difference of attitudes, because, as I mentioned in the qualitative section of the result part, American families who have a disabled member or relatives are often less ashamed, and don't try to hide their family member's disability, as well as they often seem to want their family member with a disability to enter society as much as possible, and to live as normal a life as possible. Therefore, these differences of perspectives of both countries may affect this result.

According to Seo, Oakland, Han, and Hu (1991), "effective services require awareness of social and educational traditions, social philosophies, and ways of resolving conflict that may be unique to one country" (p.217). In other words, it is important to take into consideration the educational needs in individual countries. As for Korea, my recommendation includes positive perspective or attitudes of parent of a child without disabilities, which will benefit the students and help in developing a system of integration. It is also recommended that universities develop and promote adapted physical education majors, that the Ministry of Education promote inclusion education in the schools by hiring more adapted physical educators for the classrooms. Only by supporting inclusion education in this way can the attitudes of Korean toward people with disabilities begin to change.

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(Appendix I: Questionnaire)

Background Information: For items 1-5, please check X or O in your correct answer.

1. What is your gender? 1. Male 2. Female
2. What is your nationality? 1. Korean 2. American 3. Other__________
   If you are Korean, how many years have you lived in America? ______________
3. What is the highest level of education you have completed?
   1. HS 2. Associate Degree 3. Bachelor's 4. Master's 5. Doctorate
4. Did or do you have any experience with special education or adapted physical education classes as a student?
   1. No 2. Yes (if yes, how many classes:)
5. Do you, a close family member or friend have a special education or disabled child?
   1. No 2. Yes

Parents' Attitudes: For items 6-11, circle the number that correspond to how you feel about each statement.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
6. Including students with disabilities in mainstreamed and physical education classes will diminish the experience of non-disabled.	1	2	3	4	5
7. Students with disabilities have an equal right to participate in sports programs.	1	2	3	4	5
8. Students with disabilities need to be included in youth sports programs.	1	2	3	4	5
9. Segregated education or programs will be of more benefit for students with disabilities than integrated programs.	1	2	3	4	5
10. Students with disabilities should be educated with non-disabled peers to the greatest extent possible.	1	2	3	4	5
11. Non-disabled children youth can learn and benefit from experiences with disabled youth.	1	2	3	4	5

A Pilot Study of Sport Participation: Motives and Goal Perspectives of Athletes with Physical Disabilities in Hong Kong

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Introduction

Area relating to psychological aspects of sport such as sport participation has been one of the research priorities in disability sport (DePauw, 1986). Since then some studies have conducted to examine sport participation motives of athletes with physical disabilities (e.g., Brasile, 1988; Fung, 1990, 1992; Sherrill, 1986; Vute, 1992). Results of these studies have in general shown that athletes with physical disabilities perceived fitness, health and competence as their most common motives for sport participation. Some researchers have also employed some theoretical frameworks such as goal perspective theory to determine the underlying motivation of this population (e.g., Brasile & Hedrick, 1991; Crocker & Bouffard, 1992; Page, O'Connor, & Peterson, 2001; Sherrill, 1986; White & Duda, 1993).

Goal perspective theory or achievement goal theory (Nicholls, 1984, 1989) has been one of the useful theoretical approaches to studying human motivation in sport psychology. This theory posits that individuals have two dispositional orientations operative in the achievement domains such as sport. Individuals who are task-oriented would demonstrate adaptive achievement behaviors such as exert higher effort, strive for personal mastery and self-improvement. They use self-referenced criterion to define their success and evaluate their level of competence. Individuals who are ego-oriented conversely desire to exhibit their superior ability and outperform others. Since they adopt other-referenced criterion, they tend to achieve better performance than others with less effort in the competitive situation.

Previous research on goal perspectives in disability sport has demonstrated that athletes with physical disabilities are more task- than ego-oriented (Brasile & Hedrick, 1991; Crocker & Bouffard, 1992; Sherrill, 1986). To examine goal orientations in relation to beliefs about sport success in athletes with physical disabilities, White and Duda (1993) indicated that task orientation was linked to motivation or effort belief whereas ego orientation was associated with ability or luck and illegal advantage belief. A study by Martin and Adams-Mushett (1995) also reported a strong athletic identity and its association with competitive orientation among international youth swimmers with disabilities. These findings confirmed the presence of theoretical linkage between goal orientations and cognition in achievement setting.

Little research has been conducted to determine sport participation motives in athletes with physical disabilities by using goal perspective or achievement motivation approach. A recent qualitative study by Page, O'Connor, and Peterson (2001) revealed that athletes with physical disabilities cited competence, social outlet and fitness as more important reasons for their sport participation. They were also found to be more intrinsically motivated and more "goal oriented". However, there is a lack of research on this area in Hong Kong athletes with physical disabilities. Questions such as "What are their underlying motives for sport participation?" and "Whether they have a stronger task than ego orientation or vice versa" are of particular importance if both practitioners and coaches want to meet their needs and maximize their regular involvement and performance in disability sport.

Hong Kong athletes with physical disabilities have shown to attain remarkable sport excellence and performance in Paralympic Games since 1972. Over the last three decades, Hong Kong team has continued to achieve a higher world ranking position in Paralympic Games. For example, she was positioned in the 29th of 44 in 1972, 22nd of 42 in 1984, 28th of 82 in 1992, 21st of 127 in 2000. One of the wheelchair fencers, Cheung Wai-leung, won four gold medals in 1996 Atlanta Games and a sprinter So Wa-wai, broke three world records in the 100m, 200m, and 400m in 2000 Sydney Games. While Hong Kong athletes with physical disabilities have performed brilliantly in the disability sport arena, few studies have examined their reasons for sport participation (Fung, 1990, 1992) and none has investigated this area by using goal perspective theory.

The purpose of this pilot study was therefore to examine the motives for sport participation and the goal perspectives of athletes with physical disabilities in Hong Kong.

Methods

Participants in this study were 16 athletes with physical disabilities aged 13 to 47 years (M = 36.75, SD = 8.84) who were current Hong Kong national team members. There were 12 males and 4 females. Their average year of representing Hong Kong team ranged from 1 to 24 years (M = 9.69, SD = 7.69). For years of competition, they competed for 1 to 20 years (M = 8.56, SD = 6.59). Half of them had competed for more than 10 years.

To inquire about the reasons for sport participation and their task and ego orientations, participants were asked to fill out the 30-item Participation Motivation Inventory (PMI; Gill, Gross, & Huddleston, 1983) and the 13-item Task and Ego Orientation in Sport Questionnaire (TEOSQ; Duda, 1992), respectively. The former was measured on a 3-point Likert Scale ranging from one (not at all important) to three (very important). Responses for the latter were recorded on a 5-point Likert scale with "strongly disagree" scored as 1 and "strongly agree" scored as 5.

A 10-item Perception of Physical Ability (PPA) subscale of the Physical Self-Efficacy Scale (PSES; Ryckman, Robbins, Thornton, & Cantrell, 1982) was used to determine participants' perception of physical ability. This inventory was measured on a 6-point scale (1 = strongly disagree to 6 = strongly agree). To classify participants into high or low PPA group, a mean split method was applied. Participants whose PPA scores higher/lower than the mean value were regarded as high/low PPA groups (Ryckman & Hamel, 1993).

With the assistance of the Hong Kong Sports Association of the Physically Disabled (HKSAP), team coaches were invited to help distribute the questionnaires to and collect the completed ones from their respective team members before training session in May, 2002. The Statistical Package for the Social Science (SPSS) (Norusis, 2000) was used as a tool for analyzing data. Statistical analyses included descriptive statistics, factorial ANOVA, and Pearson correlation. Level of significance for all statistical analyses were set at .05 alpha level.

Results

For sport participation motives, it was found that participants rated "I want to go for a high skill level" (M = 2.88, SD = 0.34) as the most important one. Other reasons such as "I like the action", "I like to win", and "I like the challenge" (all M = 2.81, SD = 0.40) were also important. The motives of "My parents or close friends want me to participate" (M = 1.81, SD = 0.91) and "I want to release tension" (M = 1.81, SD = 0.75) were however the least important.

Participants' task and ego orientations were measured on the 13-item TEOSQ. The mean score of the task orientation subscale was 4.15 (SD = 0.49) and the ego subscale's was 3.28 (SD = 0.74). Their average PPA level was 3.81 (SD = 0.66). Based on a mean split method, participants were grouped either into high or low PPA group dependent on their PPA mean scores. It was revealed that 11 participants were classified as High PPA group and 5 were Low PPA group.

To determine if there were significant differences in task and ego orientations between levels of PPA (High PPA group Vs. Low PPA group) and years of competition (less than 10 years Vs. 10 years or more), a 2 x 2 factorial ANOVA was conducted. There was one significant main effect for years of competition on task orientation. It was found that participants who competed for longer years were more task-oriented than those who competed for shorter years, $F(1, 12) = 5.30$, $p < .05$.

Simple correlation was also conducted to examine 30 sport motives in relation to task and ego orientations. Four significant results were obtained. With reference to Table 1, task orientation was linked with intrinsic motives such as skill whereas ego orientation was related to extrinsic motives such as win and "like to be popular".

Table 1: Simple Correlation: Sport Participation Motives and Goal Orientations

Sport Participation Motives	Task Orientation	Ego Orientation
Item 01: I want to improve my skills	.59 *	
Item 15: I like to win	.59 *	
Item 18: I like to be popular		.51 *
Item 19: I like to do something I'm good at	.58 *	

* = Correlation was significant at the .05 level

Discussion

Results of the present study demonstrated that athletes with physical disabilities rated skill- and competence-related motives as more important when they participated in sports. The win motive was also found to be equally important. However, the motives of fun, team affiliation and health were perceived as less important. These findings were inconsistent with other studies (e.g., Fung, 1990, 1992; Vute, 1992). This is not surprising since most of the participants in this study were elite athletes who competed internationally for a certain period of time (average years of competition:

8.56). Going for a higher skill level and getting the feeling of challenge would enable them to further pursuit their sport excellence. Winning is considered as recognition and evidence to prove their brilliant performance in sports. Their higher ratings in skill- and competence-related and winning motives reflect that athletes with physical disabilities have both intrinsic- and extrinsic-typed sport motives.

It was also found that participants had a higher score on task orientation than on ego orientation, indicating their tendency to use criterion-referenced standard to define their success and evaluate their level of competence. This finding was similar to previous studies on goal orientations in athletes with disabilities (e.g., Brasile & Hedrick, 1991; Pensgaard, Roberts, & Ursin, 1999; White & Duda, 1993). Participants who competed longer were found to be more task-oriented than those who competed for shorter years. This suggests that athletes competing for longer years are serious sport competitors who desire to strive for personal mastery and self-improvement. In other words, they are more intrinsically motivated.

To examine the relationship between goal orientations and sport motives, results of the present study confirmed a consonant theoretical prediction in goal perspective theory. Task orientation and ego orientation linking with intrinsic and extrinsic sport motives are well-documented in the able-bodied research, respectively (e.g., Duda, 1996). The present study demonstrated that task orientation was associated with intrinsic-typed sport motives while ego orientation extrinsic ones. This shows that individuals having different goal orientations differ in their motives for sport participation.

In order to encourage athletes with physical disabilities to sustain their sport involvement and increase their sport excellence through psychological intervention, it is important for coaches and practitioners to employ appropriate coaching strategies to meet athletes' sporting needs based on their dispositional goal perspectives. For example, the team coach can create and structure the motivational climate which fits in their dispositional goal orientations during training session. Task-oriented athletes, for instance, could be allowed more opportunity to receive challenge for personal improvement and accomplishment.

Conclusion

This pilot study shows that Hong Kong athletes with physical disabilities had a higher task than ego orientation. In particular, athletes who had competed longer were more task-oriented. Identification of their personal goals - whether task or ego, would help us understand their primary source of motivation. Due to a relatively small sample size in the present study, future research on this area with a larger local sample is recommended. By doing so, other demographic variables such as gender and perceived physical ability could also be examined which would shed more light on this important issue.

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Presentation

The Relationships between Body Composition and High Incidence of Glucose Intolerance in Paraplegia

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Introduction

In recent years, a number of studies have shown that individuals with spinal cord injuries (SCI) undergo body composition changes as a consequence of paralysis (Bauman & Spungen, 1994; Spungen, Bauman, & Wang, 1992). The risk of diabetes mellitus (DM) and cardiovascular disease is increasing in people with SCI in comparison with the able bodied population (Sorden, Walsh, & Middleton, 2000). Then, the high prevalence of DM and glucose intolerance has been attributed to the changes in body composition and muscle characteristic after the injury (Duchworth, Solomon, & Jallepalli, 1983; Katoh, Iwahashi, & Miyaji, 1998). This high prevalence of DM and impaired glucose tolerance (IGT) may attribute to change in body composition and muscle characteristics after the injury. These changes may occur due to inactivity and motor neuron paralysis in SCI patients.

The purpose of this study was to investigate the responses to oral glucose load in patients with SCI and examine the existence of a high frequency of glucose intolerance. To quantify this, we investigated the causal relationships between glucose intolerance and the changes in body composition in paraplegia.

Methods

Subjects

Seventeen males with a cervical cord injury (mean age of 26.4±1.1 years, mean period after injury 55±12 months) participated in this study. All the subjects were healthy individuals with cord transections ranging from vertical levels cervical 5 to 8 and had complete motor paralysis. Their physical activities varied widely, almost free although restricted to wheelchairs. Twenty-one healthy volunteers, matched for age, served as control subjects. None of the participants had a known history of diabetes mellitus and had a fasting plasma glucose concentration less than 126mg/dL.

All gave informed consent before enrolling in the study, which was approved by the ethics committees of Hyogo Rehabilitation Center Hospital.

Procedure

Their height, weight and body mass index (BMI), calculated as weight (kg) divided by height (m^2), were measured anthropometrically. Body composition was estimated by dual energy X-ray absorptiometry (DEXA) scanning. A total body scan (QDR-2000, Toyo Medic Corp, Tokyo, Japan) was performed on all the participants to determine total body, regional (upper and lower extremity) lean tissue mass and percent body fat (% fat).

Blood was drawn after an overnight fast. A 75g oral glucose tolerance test (OGTT) was performed, and blood samples were collected at 0,30,60,120 and 180 minutes to determine the plasma glucose and plasma insulin levels. Plasma glucose was assayed by the glucose oxidase method and insulin by double antibody radioimmunoassay. The plasma glucose and insulin values were summed by adding determinations at each time between 0 and 180 minutes and were expressed respectively as ΣPG and ΣIRI. DM and impaired glucose tolerance (IGT) were diagnosed according to the World Health Organization criteria (Expert Committee, 1997).

The Student's t test for unpaired data was used to determine statistical significance at $p < 0.005$. The data are presented as the mean ±standard deviation (SD).

Results

Table 1 describes the characteristics of body composition in quadriplegia patients. The BMI and LBM were each differed significantly. The quadriplegic group had 27 % less U/E lean than the control group ($p < 0.001$). The quadriplegic group had 42 % less L/E lean than the control group ($p < 0.001$), although % fat had no significance in either group.

Table 1: Physical Characteristics and Body Composition in Paraplegia

	SCI (n=17)		Control (n=21)
Body Mass Index (kg/m²)	19.8±2.4	*	23.3±2.8
Lean Body Mass (kg)	40.0±3.9	**	51.4±5.4
U/E lean (kg)	4.1±0.6	**	5.2±0.7
L/E lean (kg)	11.0±1.3	**	15.6±2.1
% fat	2.2±8.5		20.2±6.6

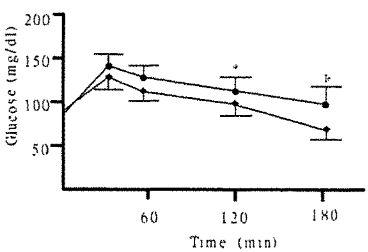
U/E lean; upper extremity lean   mean±SD

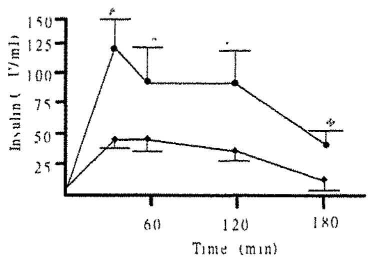
L/E lean; lower extremity lean   *p < 0.005, **p < 0.001

Figure 1 shows the plasma glucose and plasma insulin values after 75g OGTT in the quadriplegic and control groups. The quadriplegic subject had significantly higher mean glucose (at 120 and 180 minutes) and insulin (at 30, 60, 120 and 180 minutes) values than the control group. Seven of 17 quadriplegic patients (41 %) showed IGT by OGTT, compared with 2 (6 %) of the control group.

Figure 1: Glucose Values and Insulin Values in Quadriplegic and Control Groups During 75g Oral Glucose Tolerance Test Quadriplegics (●) and Control (◆)

*p < 0 01, ※p < 0 005, ※※ p <0 0001





Glucose tolerance disorders by OGTT in the quadriplegics are shown in Table 2. The fasting plasma glucose and plasma insulin levels had no significant differences in either group. In the quadriplegic group, ΣPG in OGTT was higher than that of the control (589.1±84.0 vs 516.8±58.3 mg/dL, p < 0.005), and ΣIRI was higher intentionally than that of the control (354.2±205.1 vs 136.4±42.5, p < 0.001).

Table 2: Clinical and Metabolic Characteristics by Oral Glucose Load in Paraplegia

	SCI (n=17)		Control (n=21)
Fasting glucose (mg/dL)	89.7±5.8		93.0±5.5
Fasting insulin (μU/mL)	6.9±3.5		6.4±2.8
ΣPG (mg/dL)	598.1±84.0	*	516.8±58.3
ΣIRI (μU/mL)	354.2±205.1	**	136.4±42.5

*p < 0.005, **p < 0.001 mean±SD

Discussion

In this study, we investigated the changes in body composition, and the association between these characteristics and insulin sensitivity indices, evaluated from the oral glucose load, in individuals with paraplegia. Immobilization is associated with profound changes in the body composition in SCI patients (Uebelhalt, Demiaux-Domenech, & Roth, 1995). It has been reported that SCI patients lost lean tissue mass and bone mineral content, but gained body fat (Jones, Goulding, & Gerrard, 1998; Spungen, Bauman, & Wang, 1995). The potential risks involved with these changes in body composition have implications for the morbidity of quadriplegic patients. The risk of DM and cardiovascular disease is increasing in SCI patients with a longer life expectancy. Baumann and Spungen demonstrated that 22 % of subjects with SCI had DM as compared to only 6 % in an abled-bodied control group (Bauman & Spungen, 1994). 62 % of subjects with quadriplegia and 50 % with paraplegia had abnormal glucose tolerance compared to 18 % of the controls (Duchworth et al., 1983). Our results proved, similarly, that 7 of 17 quadriplegic patients (41 %) had IGT by OGTT, compared with 2 (6 %) persons in the control group. This high prevalence of DM and IGT has been attributed to changes in body composition and muscle characteristics after the injury. These changes may occur due to inactivity and motor neuron paralysis in people with paraplegia or quadriplegia.

The mean fasting PG and fasting IRI values in both groups were within the normal range. However, the sum of PG and IRI values by OGTT in paraplegia was significantly higher than in the control. Duckworth et al. (1983) demonstrated that more than 40 % of a group of glucose intolerant SCI patients had elevated insulin levels, suggesting tissue resistance to endogenous insulin (Duckworth et al., 1980). The etiology of insulin resistance in individuals with SCI has not been explained. Recently, Laakso (1995) reported that fasting insulin provides a good surrogate for insulin resistance across the range of glucose tolerance. Prolonged inactivity has been shown to impair glucose tolerance with associated hyperinsulinemia. Jeon, Weiss, and Steadward (2002) reported that exercise with electorical stimulation-assisted cycling is beneficial to improve glucose tolerance and insulin sensitivity in people with SCI (Chilibech, 1999). Significant changes in the skeletal muscles of people with SCI include a pronounced reduction of Type I, Type IIa and GLUT-4 levels (Chilibech, 1999). It is suggested that muscular changes after paralysis could be one cause of insulin resistance in SCI patients.

In summary, we demonstrated that there are decreases in regional LMB, but not total % fat, and glucose intolerance due to decreased insulin sensitivity in paraplegia patients. This suggests that insulin resistance may be due to nongenetic processes, but the mechanisms are not clear. Additional studies are also required to evaluate the relative contribution of specific factors to glucose intolerance and insulin resistance in SCI patients.

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Dance Activities of Children with Disabilities

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Introduction

Children with disabilities enjoy few chances for self-expression. Dance's components of music and movement possess the power of evoking emotional empowerment. Furthermore, dance produces a sense of involvement within a group. The purpose of this study was to examine how dance activities would enhance the independence and sociality of children with disabilities.

Methods

Subjects in this study were the members of the dance circle Triangle. Triangle is composed of 10 children with disabilities and volunteer student helpers. The children who suffer from intellectual disabilities, Down's Syndrome, cerebral palsy or blindness were involved. There were practices held once a month.

Dance activities of the children who participated in Triangle were recorded on the videotape. Researcher would examine if there were behavioral changes of the subjects based on the videotape recorded as well as the interview conducted with their mothers and volunteers. Dance activities were video-taped from April to November, 2001.

Results

Case 1

She was eleven years old and she was blind. She did not suffer from any mental disorder or disability. She had a very firm and clear idea of what kind of dance she would like. Her hope was to dance while spinning a fula hoop in time with the music she enjoyed, namely Japanese popular music by Gray and SMAP.

She learned the two basic dance steps, touching other student's legs. Then, she confirmed the direction in which her legs should move, and the length of stride. We thought that it would be difficult for her, but she persevered and learnt the steps. Since Azusa wanted to dance the steps with Aiko, our student volunteer, she concentrated on committing them to memory.

Her firm resolve was found on her constant wish to dance together with a partner. This led to the growth of close feelings between her and our student volunteer. She persisted in her efforts and danced in a live performance. Her definite goal was to have a constant source of encouragement.

Case 2

She was ten years old and suffered from cerebral paralysis. She was not able to drive her wheelchair. She liked very much having her wheelchair pushed here and there.

We chose a waltz because she liked its flowing. She moved in accordance with Viennese Waltzes. She found it enjoyable to change after ribbon in accordance with the music. We recognized the changing of her facial expressions reflected the positive emotions generated in her while dancing. Her friend's mother was impressed to see that her smile on that day was the most joyous it had ever been.

We thought that it was better for the people to experience dance which they like. Such dance is not for those who possess the ability to move their bodies but for their own wish or will. We found that our subject enjoyed the dancing movement as much as possible although she had a student who helped push her wheelchair.

Case 3

She was fourteen years old. She was blind and suffered from intellectual difficulties. She listened to the music which she liked. Her sensitivity towards music was very high, and she possessed a fine feeling for rhythm. She liked music of a kind which differed from that of other children. We could grasp her taste in music. The sound of the drum greatly appealed to her as dose gospel and the music of black Africa. We played much music to her. The music which she first favored was a very special music form namely, that which accompanied the recitation of the Buddhist scriptures.

When hearing such music for the first time she spontaneously began to jump and skip in some kind of time with the music. She would search amongst our student volunteers for the people whose mood or atmosphere were compatible. In time she came to pay heed to and act upon volunteers' suggestions and advice. The students taught her about dance steps and routines. She came to fit with the dancing routine and steps with the music which she liked.

She was happy to follow the music to dance with the students. She accepted the idea of performing movements in liaison with the students. Although she was in poor health in the day of the live performance, she could dance from beginning to the end.

Case 4

He was eighteen years old. He had the most severe disability in our group. He was blind and had intellectual difficulties and difficulty in motor functions and epilepsy. However, while he listened to the music which he liked, he would break into a smile, and then move his body slowly with the music. In his dance, he made use of the movement which he usually liked.

He was good at pushing his wheelchair. It came as an surprise to our audience that he was able to stand and push the wheelchair rather than just sit on it. The most interesting dance for him was that all of his fellow-members took their cue from him, following his movements in the dance. Leaving the stage, he ventured amongst the audience on the floor, moving his body in accordance with the music. They in turn imitated his movements. He felt great happiness when the audience was dancing together with him. Through these pronounced rhythmic bodily movements, both Takeo and the audience could express their growing feelings of happiness and pleasure. When many people performed the same small bodily movement, it became dynamic.

Conclusion

Based on these case studies, I found that creating this unique form of dance service would enhance children's sense of independence. Continuing with such dance activities leads to a complete change in their social expressions.

Twin Basketball by Persons with Severe Disability Due to Quadriplegia

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Introduction

This paper is a report of the activity video.

What is Twin Basketball?

In Japan, we have Twin Basketball for people with severe disabilities. Twin basketball is comprised of two kinds of baskets; one is 305cm high and the other is 120cm high. There are two goals and hence "Twin Basketball" is named. The idea of Twin Basketball was first thought of in Japan.

The Complications of Making Twin Basketball

Ordinary Wheelchair Basketball was founded by people with less severe disabilities such as thoracic and lumbar spinal cord injuries. However, people with quadriplegia could not play the previous style of wheelchair basketball because of their severe motor paralysis. Because of this, two Japanese hospital's sports therapists changed the rules and allowed for people with severe paralysis to play wheelchair basketball.

In 1982, the first game of wheelchair twin basketball was played to promote goodwill. The game was played between teams from Hakone National Hospital and Kanagawa Rehabilitation Center was played by people with cervical spinal cord injuries.

Twin Basketball demonstration games were introduced in 1983 in the Japan

Wheelchair Basketball Championship, and continued for several years after that time. The first title game of Japan Wheelchair Twin Basketball was held in 1987.

To introduce this game, some of the teams played in Korea, England, New Zealand and Taiwan.

In May 2003 the 17th Japanese Wheelchair Twin Basketball Championship game was held. In addition to a championship game, we play league games for 6 months at each local place. Presently 50 twin basketball teams join the league game.

The Rule

The major difference between the previous style of wheelchair basketball and Twin basketball is the existence of two kinds of baskets; one is 305cm high and the other is 120cm high in the center of the free-throw circle. The lower basket allows a person who has more severe cervical cord injuries, and who could not normally reach the higher basket, to have a greater chance to hit a goal. The shooting method is according to level of residual function. There are three methods of shooting: (1) players shooting inside the free-throw circle; (2) players shooting outside the free-throw circle; and (3) players shooting at a higher goal. As a result, more people can have fun playing basketball.

Regulation court size is the same as a regular basketball court. We usually use a No.5 sized ball. The ball shall be made with an outer rubber cover. If a leather ball is used, it will slip because players have paralysis.

People with quadriplegia have many different abilities of motor function. The player classification point system was developed in order to make it possible for the quadriplegics with different functional limitations to play. Players have corresponding points 1 to 4.5, according to their residual function. To make the game fair, no teams can have more than 11.5 corresponding points. It makes for good team balance and allows players with both lower and higher level to take part in the game.

Twin basketball is specifically for people with quadriplegia such as cervical cord injury.

Introduction of Team Activity

To take an example, I would like to introduce activities of team Shotgun in Kanagawa. In 1989, an organization was formed in Kanagawa and most members were people with quadriplegia. The members wished to play some types of sports activities, and thus the team Shotgun was formed. They decided on the team name "Shotgun" because of its spreading effect. The idea of spreading "Shotgun" promoted harmony and allowed many players with various degrees of motor function to come together and to form twin basketball teams.

The Shotgun team has ten players, two coaches and three managers. Team training is three times per month in a gym in Kanagawa. Usually other team players join our training. During league game season of spring to autumn, we have one or two games a month. Team players have team meetings which decide managerial issues and share management and accountant duties.

We have an annual event and a New Year's party which also includes an overnight stay at a hotel. The team members and guests go to a tourist resort in the local area.

Study

We asked the members about the advantages and disadvantages of this game activity.

Advantage:

Physical	Twin basketball made me physically stronger.
	My muscular power is up and I have become healthier (I don't catch colds as often).
	My skill using my wheelchair has grown, and in daily life I can avoid colliding with people.
	Become thin. Health management. Humans need exercise to eat more.
Mental	When I play well, I feel pleasant.
	I have good relationship with players without any concerns (There are no win-or-lose situations).
	It helps me to build fellowships.
	When I am active, I feel relief.
	When I play, I don't think about anything. I get mental comfort, and get energy to face tomorrow.
Another	I use the train to go to training.
	I can meet many people.
	My life is apt to be only in my house. I get outside more since I started playing wheelchair basketball.
	My physical fitness has greatly increased. I was not able to go up a slope but now I can. When I go out with my wife she does not have to push my wheelchair. I can push myself.

Disadvantage:

There were many opinions; stating mostly, "nothing was bad about it."
When I request assistance because I cannot do something.
Getting enough team members.
Time for the family is sacrificed because of Twin Basketball. (Team member family says angrily 'you are going to practice again?')
For fear of associating with others.
The player must pay high cost to have a wheelchair made.

The team member expressions relating to physical fitness were supported by data on four players. Cases 1 to 3 present the physical fitness of the white headband players while Case 4 the no headband player.

Figure 1 shows the data for muscular power for the 20m run. The data were for the last three times. The data indicated that as players were older, they were faster.

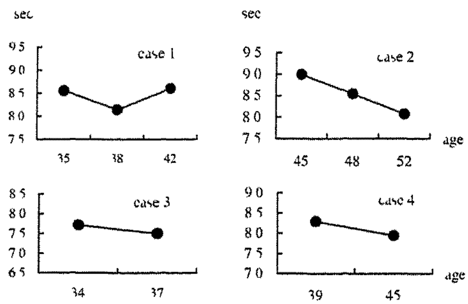

Figure 1: 20m Run (Muscular Power)

Figure 2 shows the data of zigzag dribble (muscular agility and coordination). Data indicated all players were faster with age.

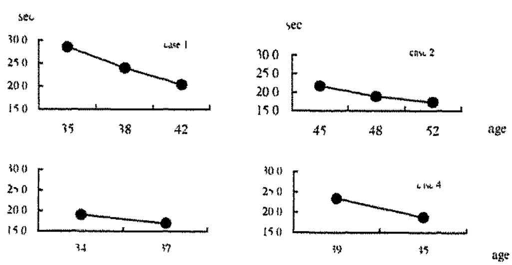

Figure 2: Zigzag Driddle (Muscular Agility and Coordination)

Figure 3 presents the data of the pass (muscular power). Data indicate that some player's passes became longer with age.

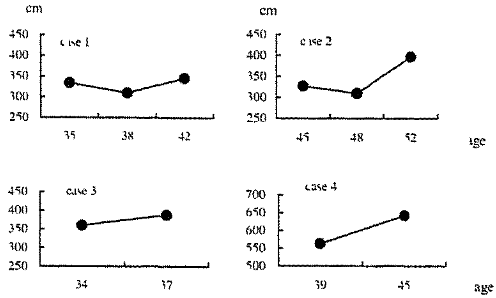

Figure 3: Chest Pass (Muscular Power)

Discussion

From this study we found some problems. The first is the current skill level is higher, rules are revised because of normal basketball rule revision. Normal basketball rules allow for more speed, therefore, it's awkward for a beginner (especially for people with more severe disabilities to play wheelchair basketball).

Another problem is that, some people cannot continue playing basketball. Reasons given were: health and physical conditions decreased, work, and fear of association with others.

Conclusion

This sport makes many contributions to the physical fitness of people with quadriplegia. It makes the players healthier and improves their physical strength. Finally, it contributes to the development of mental health in their daily lives. Below is a summary of the benefits derived from sports participation such as Twin Basketball.

- In spite of their paralysis; it gives them a chance to go outside (People with paralysis are more apt to stay inside.)
- It allows greater exchange with people.
- Sports are great for releasing stress.
- Sports help them to be able to change their minds.
- It contributes to better physical fitness, better health, increases physical strength, improves mental fitness, and enhances daily life.

Twin basketball allows many chances. It is one tool that offers more affluent Quality-of-Life to individuals with disabilities.

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Student Activity Levels and Teacher Behavior During Primary Four-to Six-Grade Physical Education Lesson for Students with Mental Retardation

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Introduction

Individuals with moderate and severe mental retardation (MR) were substantially less fit than were those with mild MR (Londeree & Johnson, 1974; Rarick, Widdop, & Broadhead, 1970). The explanation was delayed physical development, limited motivational levels or fewer opportunities to participate in fitness programs (Fernhall, Tymeson, & Webster, 1988; Miller, Fernhall, & Burkett, 1993). Furthermore, the fitness and overall functioning in children with mental retardation (MR) were lower, due to the fact that they were not active during the school day and they had limited opportunities to participate in physical activities (Horvat & Franklin, 2001). Therefore, it is important to promote the concept of physical activity to the children of this special population. An effective means of health promotion for children is through school physical education (PE) programs. The purpose of the present study was to determine the activity levels and teacher behavior of primary 4th to 6th grades physical education (PE) lessons for students with mild and moderate MR in special schools in Hong Kong. The findings of the study may contribute to a better understanding of the PE teachers' behavior that influence physical activity levels for students with mild to moderate mental retardation in PE lessons.

Methods

This study involved systematic observation of thirty-three PE lessons with 18 lessons for students with mild MR and 15 lessons for students with moderate MR. The students came from three special education schools which offer both mild and moderate MR classes from primary 1 to secondary 3 levels. However, the current study focused only on primary 4 to 6 PE lessons. In School A, there was one PE teacher per class and the classes observed ranged from 11 to 38 students. School C was similar to School A; there was one PE teacher per class and the class size ranged from 7 to 18. In School B, two PE teachers were assigned to teach a class and the class size ranged from 8 to 15. Information about the area available for PE lessons, number of teachers engaged in PE lessons and the content of PE lessons across the three schools was shown in Table 1.

Table 1: Background Information on the Three Special Schools

			School A	School B	School C	
Space of PE lessons (sq meter)			Covered playground (1,010)	Basketball court (1,039)	Track & Field court (2,020)	Covered playground (1,615)
No. of PE teachers being observed	Single-teacher	Mild	6	-	2	-
		Moderate	6	-	1	2
	Dual-teachers	Mild	-	4	-	-
		Moderate	-	6	-	-
Type of PE lessons observed	Mild	Motor Skill	3	2	-	-
		Motor skill & fitness	3	-	-	-
		Basketball	-	1	-	-
		Fitness	-	1	-	-
		Track & Field	-	-	8	-
	Moderate	Motor Skill	5	2	-	-
		Motor skill & fitness	1	-	-	3
		Fitness	-	1	-	-
		Circuit Training	-	1	-	-
		Track & Field	-	-	2	-
Total no. of PE lessons			12	8	10	3

Instrument

The study used the observation instrument known as the System for Observing Fitness Instruction Time (SOFIT), designed by McKenzie et al. (1991). SOFIT is a direct observation instrument yielding 3 sets of data. The first set of data involves physical activity levels categorized into five different types: lying down, sitting, standing, walking or very active. An additional activity level of moderate to vigorous physical activity (MVPA) can be yielded by summing up scores of "walking" and "very active". The second set of data involves lesson context differentiated into seven categories: management, general knowledge, fitness knowledge, fitness activity skill practice, game play and free play. The third set of data involves categorization of teacher behavior into six types: promotes fitness, demonstrates fitness, instructs generally, manages, observes and off-task. The instrument requires time-sampling observation for each 20-second interval (McKenzie et al., 1991). In this paper only results of students' activity levels and teacher behaviors were presented.

Procedures

The study was conducted from mid October to early December, 2001. The first author of this paper served as the observer. She observed 33 PE lessons of 30~35 minutes duration per lesson. For each class, two separate observations were conducted on two different days per a week. All PE teachers were told to teach their classes as normal without changing the unit or lesson plans. There was no observation conducted on rainy days. The overall class size of observed lessons ranged from 7 to 38 students, and the average observation duration was 24 (SD±4.45) minutes in length for a PE lesson. Before each lesson, the observer randomly pre-selected 5 students from the students' name list to be the observed subjects. In order to single out these students for observation, they were asked to wear different color ribbons across their chests. Data were collected at 10 second intervals for observation and the following 10 seconds for recording. The same procedure was repeated for the whole lesson.

The dependent variable of the study was the observation score of physical activity and teacher behavior. Data included levels of physical activity presented as the total time and fraction of the lesson on each level (see Table 2) and the six levels of teacher behavior were presented as the total time and fraction of the lesson on each level (see Table 3). Data on the time engaged (minutes) in physical activity reflects the physical activity patterns of intensity and duration.

Table 2: Dependent Variables for Activity Levels of SOFIT

Dependent Variables	Unit
Lying down; total time & fraction of lesson	Minutes, %
Sitting; total time & fraction of lesson	Minutes, %
Standing; total time & fraction of lesson	Minutes, %
Walking; total time & fraction of lesson	Minutes, %
Very active; total time & fraction of lesson	Minutes, %
*MVPA; total time & fraction of lesson	Minutes, %

*MVPA = level of walking + level of very active

Table 3: Dependent Variables for Teaching Behaviors of SOFIT

Dependent Variables	Unit
Promotes fitness; total time & fraction of lesson	Minutes, %
Demonstrates fitness; total time & fraction of lesson	Minutes, %
Instructs generally; total time & fraction of lesson	Minutes, %
Manages; total time & fraction of lesson	Minutes, %
Observes, total time & fraction of lesson	Minutes, %
Off-task, total time & fraction of lesson	Minutes, %

Data Analysis

Data were analyzed by the SPSS/ PC software program for Windows. Analysis of variances of 2 (mild MR vs. moderate MR) x 2 (dual-teacher vs. single teacher) ANOVA was conducted for each dependent variable (activity levels & teacher behavior). All statistical testing was set at the 0.05 level of significance.

Results

The mean PE lesson length ranged from 23.14 to 29.58 minutes for students with mild MR and ranged from 19.31 to 27.26 minutes for students with moderate MR. The mean minutes of student activity levels during a PE lesson for students with mild and moderate MR ranged from 2.11 to 8.61 and 1.51 to 7.71, respectively (see Figure 1). Mean minutes of teacher behaviors on PE lessons for students with mild and moderate MR ranged from 0.65 to 8.24 and 0.42 to 8.33, respectively (see Figure 2).

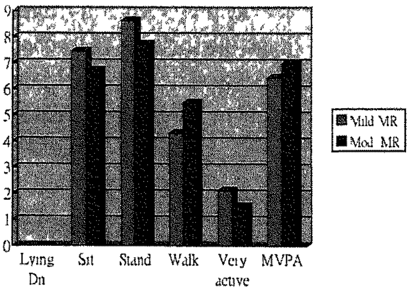

Figure 1: Mean Minutes of Students' Activity Levels on PE Lessons for Students with Mild and Moderate MR

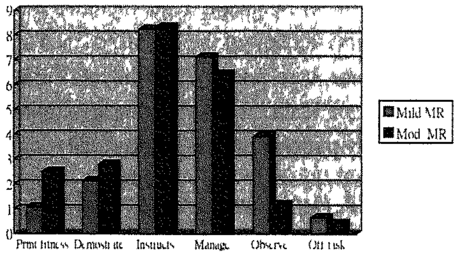

Figure 2: Mean Minutes of Teacher Behavior on PE Lessons for Students with Mild and Moderate MR

Activity Levels for Mild and Moderate MR PE Lessons

Classes for mild and moderate MR engaged similar activity levels in terms of the proportion of each activity level time to the total PE lesson time (F ranged from 0.07 to 2.62, $p > .05$). No significant main difference was found between classes of mild and moderate MR on all activity levels, as shown in Table 4.

*Table 4: Proportion of Lesson Time for Students Activity Levels for Students with Mild and Moderate MR on 3 Schools ***

	Mean proportion of lesson time % (SD)	
Student activity levels	Mild MR	Moderate MR
Lying	0.22 (0.67)	0 35 (1.06)
Sitting	32.08 (21.15)	29 24 (17.04)
Standing	35.65 (10.66)	35.26 (14.26)
Walking	17.01 (9.68)	24.73 (10.44)
Very Active	8.54 (5.01)	6.86 (3.20)
#MVPA	25.55 (12.45)	31.59 (11.77)

*p< .05 ** Observation data from 33 PE lessons #MVPA = walking + very active

Teacher Behaviors for Mild and Moderate MR PE Lessons

There was significant main effect for types of MR on the "promote fitness" aspect of teacher behavior in the PE lessons ($F = 5.56$, $p = .025$). Teachers engaged a higher proportion of the total PE time in "promote fitness" for moderate MR classes (11.49 %, SD±9.96) than mild MR (4.57 %, SD±4.89) (see Table 5). Besides, there was also significant main difference for types of MR on "observation" of the teacher behavior on PE lessons ($F = 8.35$, $p = .007$). Teachers engaged a higher proportion of PE time in observation during mild MR (16.42 %, SD±9.67 %) than moderate MR (5.87 %, SD±7.30) (see Table 5). There was no significant main difference for types of MR on the "demonstrate fitness", "instruct generally", "manage" and "off-task" aspects of teacher behavior.

*Table 5: Proportion of Lesson Time for Teacher Behavior for Students with Mild and Moderate MR on 3 Schools ***

	Mean proportion of lesson time % (SD)	
Teacher Behavior	Mild MR	Moderate MR
Promotes fitness	*4.57 (4.89)	*11.49 (9 96)
Demonstrates fitness	8.01 (11.18)	11.70 (12.72)
Instructs generally	34.39 (13.02)	38.00 (13.94)
Manages	29.89 (10.56)	28.52 (9.07)
Observes	*16.42 (9.67)	*5.87 (7.30)
Off-task	2.84 (4.01)	1.85 (2.01)

*p< 05 ** Observation data from 33 PE lessons

Activity Levels for Dual-teachers and Single-teacher Instruction

There was significant main effect caused by the numbers of teachers teaching only on sitting, walking and moderate to vigorous physical activity (MVPA) of students' activity levels in the PE lessons ($p < .05$). There were no mean differences in lying, standing and very active of students' activity levels between single-teacher instruction and dual-teachers instruction ($p > .05$), as shown in Table 6. There was significant main effect caused by the numbers of teachers teaching on "demonstrates fitness" of teacher behavior in the PE lessons ($p < .05$) and there was no significant main effect caused by the numbers of teachers teaching for the rest of teacher behavior categories in the PE lessons ($p > .05$), as shown in Table 7.

*Table 6: Proportion of Lesson Time for Students' Activity Level on 3 Schools for Single-teacher and Dual-teachers Instruction Format***

	Mean proportion of lesson time % (SD)	
Student activity levels	Single teacher	Dual teachers
Lying	0.16 (0.58)	0.66 (1.42)
Sitting	*34.60 (19.81)	*18.90 (10.84)
Standing	35.82 (13.72)	34.39 (6.01)
Walking	*17.46 (9.45)	*30.08 (8.43)
Very Active	7.56 (4.49)	8.46 (3.88)
#MVPA	*25.02 (11.20)	*38.55 (10.39)

*p< .05 ** Observation data from 33 PE lessons #MVPA = walking + very active

*Table 7: Proportion of Lesson Time for Teacher Behavior Taught by Single-teacher and Dual-teachers Instruction Format***

	Mean proportion of lesson time % (SD)	
Teacher behavior	Single teacher	Dual teachers
Promotes fitness	8.22 (8.75)	6.13 (6.80)
Demonstrates fitness	*4.49(6.24)	*25.94 (10.56)
Instructs generally	37.45 (12.44)	31.62 (15.98)
Manages	30.81 (10.09)	24.46 (7.32)
Observes	13.02 (10.60)	7.26 (7.06)
Off-task	2.85 (3.60)	0.95 (0.85)

*p< .05 ** Observation data from 33 PE lessons

Interaction Between Activity Levels, Teacher Behavior and Types of MR

There was no significant interaction effect on either activity levels or teacher behaviors during PE lessons for students with mild MR and moderate MR and the number of teachers teaching the PE lessons.

Discussion

Findings in this study showed that teachers spent more time on promoting fitness for students with moderate MR than for students with mild MR. One of the reasons is the lower motivational levels towards being physically active among students with moderate MR than with students with mild MR (Fernhall, Tymeson, & Webster, 1988). However, more encouragement should be given to both students with mild and moderate MR to be physically active generally so that their physical activity levels during PE lessons can be increased. Moreover, PE teachers spent more time on class observation for students with mild MR. A possible reason is that teachers in mild MR PE lessons dealt with fewer disciplinary problems than those teaching moderate MR PE lessons. Lastly, the result indicated that PE lessons for students with mild or moderate MR engaged in a similar pattern of activity levels. This finding might be due to the relatively low intensity level of activity displayed by both mild and moderate MR students. The percentage of MVPA was 25 % and 32 % for classes with students of mild and moderate MR, respectively. Results in this study showed that the overall pattern of students' physical activity mainly involved sitting, standing or walking with minimal running during PE lessons. McKenzie et al. (1995) found MVPA averaged 36.2 % per PE lesson for 3rd graders. Apparently, the present results and McKenzie et al. (1995) both failed to achieve the guideline recommended by Healthy People 2000, which suggested for 50 % proportion of school PE class time being contributed to MVPA.

On the other hand, PE teachers spent 29.89 % (mild MR) and 28.52 % (moderate MR) on class management. When managing a class with MR students, PE teachers need to spend time for setting up the equipment for each activity. Unlike teaching children without disabilities, PE teachers in special classes cannot rely on students to assist with class preparation chores. Moreover, research findings in the US with pupils without disability showed that PE lessons allowed very little time for pupils participating in fitness activity to acquire health-related fitness knowledge, and teachers spent little time promoting and demonstrating fitness (Matthew et al., 1996). This study had a similar finding.

Most significantly, dual-teacher instruction classes showed that children had a higher percentage of MVPA activity levels than those in single-teacher instruction classes. In Van der Mars, Vogler, Darst, and Cusimano (1998) study on the general population of students' physical activity levels and teachers' active supervision during fitness instruction, they found that students' level of MVPA was significantly increased when the student to teacher ratio was reduced to 3 to 1. Moreover, teachers spent over ninety percent of lesson time in peripheral activity, actively moved about and provided augmented feedback to students during fitness instruction (Van der Mars et al., 1998). In dual-teacher instruction classes, this study found that teachers spent more time on "demonstrate fitness" for students than single-teacher instruction. This result could be explained by the efficiency of class management and better utilization of class instruction time by the dual-teacher instruction format during PE lessons. Van der Mars et al. (1998) also commented on the higher rates of corrective feedback, the higher levels of students' walking and more MVPA behavior. Low motivation was found in an exercise program for children with moderate and severe MR (Halle, Gabler-Halle, & Chung, 1999). Therefore, we suggest adopting the dual-teachers instruction format especially for students with moderate MR in order for teachers to effectively allocate more time to motivate individual students to achieve MVPA during PE lessons.

Suggestion on Health-related PE Programs

For students with MR, it may be a bit hard to push them to move more, as they are less motivated to be physically active. We suggest conducting more group fitness exercise and incorporate circuit training into PE lessons for primary classes. In the group fitness exercise, PE teachers can conduct some locomotor movement with simple aerobic dance choreography together with strong rhythmic beats. Exercise intensity can be targeted at moderate intensity with intermittent short bursts of vigorous activity. In the circuit training exercise, teachers can include both cardiovascular and muscular fitness with 5 to 6 different stations for upper primary students and 2 to 3 exercise stations for lower primary students. For younger children, PE lesson content can mainly focus on increasing physical fitness as opposed to teaching sports skills, such as basketball and volleyball. For older students, PE lesson content can include both physical fitness training and sports skills but with heavier emphasis on the former.

Conclusion

Students with mild and moderate MR seem to have similar physical activity levels in PE lessons. It appears that teachers spend more time on observation during PE lessons for students with mild MR while teachers spend more time to "promotes fitness" during PE lessons for students with moderate MR. It also appears that dual-teacher instruction format increases the proportion of students' activity on walking and MVPA and decreases the proportion of lesson time for students' activity behavior on sitting during PE lessons. Moreover, the dual-teacher instruction format seems to increase the proportion of teacher behavior on "demonstrate fitness" during PE lessons.

Recommendations for Further Studies

A larger sample size is needed to give a more accurate picture of students' physical activity level in PE lessons. Researchers can also collect data on more days and more types of PE lessons in different schools. Lastly, since the lesson context may influence the levels of students' physical activity in PE lesson, an analysis of physical activity, lesson context and teacher behavior may give additional information about what students and teachers do in PE lessons.

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Identification of Physical Awkwardness in Early Childhood in Japan: Usefulness of the Movement Assessment Battery for Children

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Introduction

Concerns for young children who find it difficult to acquire the movement competence necessary for successful progress in daily life has only recently emerged. They are called "physical awkwardness" (Wall, 1982; Wall, Reid, & Paton, 1990), "clumsy child syndrome" (Walton, Ellis, & Court, 1962), "specific developmental disorder of motor function" (World Health Organization, 1992a, 1992b, 1993), or "developmental coordination disorder" (American Psychiatric Association, 1994).

Young children with physical awkwardness are relatively slow and inaccurate in all sort of perceptual-motor skills (Cratty, 1994; Sugden & Wright, 1998). They have unexpected difficulties of motor coordination skills that may affect fine motor task such as writing and buttoning clothes, gross motor task such as running and jumping, aiming such as throwing and rolling, interception task such as catching, as well as balance and posture. Moreover, the long-term prognosis for children with physical awkwardness is not good in general, although some children catch up with peers (Cantell, Smyth, & Ahonen, 1994; Cantell, 2001). Physical awkwardness is considered to contribute not only to the development of motor skills but also to have a more general impact on individual's experiences.

In Japan, in contrast to child with more severe disability such as cerebral palsy, muscular dystrophy, using wheelchair, and others, child with physical awkwardness receives limited provision. For example, as we do not have any appropriate standardized instruments for identification and assessment of young children with physical awkwardness, it is even difficult to manage and intervene them in some movement programs.

In many studies involving physical awkwardness, the Movement Assessment Battery for Children (MABC) (Henderson & Sugden, 1992) has been the instrument most widely for identification of children. To date, normative data have been collected in the United States, Canada, and the United Kingdom. More recent projects have involved data collection in the Netherlands (Smits-Engelman, Henderson, & Michels, 1998), Sweden (Rosblad & Gard, 1998), and Hong Kong (Chow, Barnet, & Henderson, 2001). A little is known about Japanese children with physical awkwardness (Miyahara et al., 1998), but there is no data in early childhood.

The purpose of this study is to determine whether MABC package (Henderson & Sugden, 1992) is suitable for use in Japanese young children preliminarily and to identify the classification of the type of physical awkwardness.

Method

Participants

A total of 194 Japanese young children (see Table 1) participated in the study. They attended nursery school or kindergarten in suburban area of Hiroshima city.

Table 1: Number of Children Per Age for the Japanese Samples

Age	Male	Female	Total
4 (4:0 - 4:11)	32	29	61
5 (5:0 - 5:11)	40	33	73
6 (6:0 - 6:11)	32	28	60
Total	104	90	194

Test Material and Procedure

The assessment tool used was MABC. MABC is an integrated package that has evolved over a period of about 30 years (Sugden & Wright, 1998). The assessment component of MABC has two parts: (a) a performance test to be individually administered and requires the child to perform a series of motor task, and (b) a checklist that is completed by an adult who is knowledgeable of the child's everyday functioning. MABC combines quantitative and qualitative assessment in concern for the identification and description of impairments of motor functions in children.

The participants' teachers of each nursery school or kindergarten were shown how to use M-ABC checklist. And in each place, we tested all participants by AGE

BAND 1 of MABC test designed for use with 4-6 year old children. All testing or checking took place in the gymnasium or the outdoors of his or her place. We were able to obtain the data on a sample of 194, 4, 5, and 6 years old.

Results and Discussion

MABC Test

1. Qualitative observation

The Japanese young children responded very positively to the tasks contained in the test. No administrative problems were encountered (Photo).

Photo: "One-leg Balance (left)" and "Walking Heels Raised (right)" (4-year-olds)

2. Comparison within the Japanese samples and between the Japanese and American children

Data was shown in Table 2. The young children were divided first according to age and secondly gender. Age and gender differences were similar and no significant differences were obtained.

Table 2: Mean Values (Standard Deviations) on MABC Test Items for Japanese Young Children and Comparison between 61 4-year-old Japanese and 210 4-year-old American Children from the U.S. Standardization (from MABC Manual, p.208)

Task (measure)	Age 4 (J)	Age 4 (U.S.)	Age 5 (J)	Age 6 (J)
Manual dexterity				
Posting coins, prefer hand (time: s)	25.0 (5.2)	21.6 (7.3)	20.0 (3.8)	19.1 (3.6)
Posting coins, other hand (time: s)	29.4 (7.0)	24.5 (8.2)	22.0 (5.2)	20.3 (4.7)
Threading beads (time: s)	97.5 (44.8)	34.1 (13.9)	71.2 (27.0)	56.7 (10.2)
Pencil control (No. of error)	3.8 (3.1)	2.8 (2.8)	1.5 (1.7)	0.8 (1.2)
Ball skills				
Catching bean bag (No. out of 10)	6.8 (2.2)	7.0 (2.5)	7.6 (1.5)	8.1 (1.9)
Rolling ball into goal (No. out of 10)	5.7 (1.8)	5.6 (2.3)	5.6 (1.7)	6.1 (2.0)
Static and dynamic balance				
One-leg balance, prefer foot (time: s)	9.1 (6.4)	9.3 (6.3)	15.4 (5.5)	17.7 (4.2)
One-leg balance, other foot (time: s)	9.3 (6.7)	8.8 (6.1)	15.8 (6.0)	16.8 (5.0)
Jumping over cord (No. of trials to pass)	1.1 (0.3)	0.3 (0.7)	1.0 (0.2)	1.0 (-)
Walking heels raised (No. of steps)	13.8 (3.4)	11.6 (4.2)	14.4 (2.4)	14.1 (2.8)

Furthermore, the performance data for 61 Japanese 4 years old children (our original data) and their matched controls from U.S. standardization (from MABC manual, p. 208) were presented and compared.

3. The typification of physical awkwardness

The performance data were analyzed on the motor character, the fine motor items (total 4 subtests: Manual dexterity (3 subtest) and Ball skills/Catching bean bag) and the gross motor items (total 4 subtests: Ball Skills/Rolling ball into goal and Static and Dynamic Balance (3 subtest)).

The young children who have physical awkwardness (32 young children; the impairment score is over 9) were typified into three subgroups, type-I, type-II, and type-III (see Figure 1). The character of subgroup of type-I (14 children) was fine motor dominance and gross motor problems. In contrast, the character of subgroup of type-II (15 children) was gross motor dominance and fine motor problems. It was the characters of type-III (3 children) that gross motor is no problem, but they have severe difficulties on fine motor area.

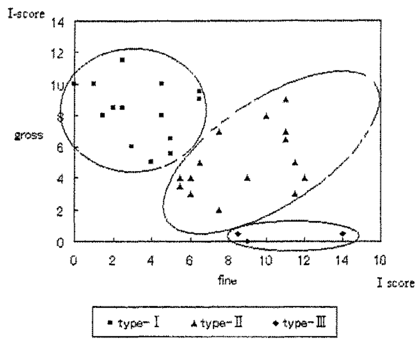

Figure 1:The Typification of Physical Awkwardness in Early Childhood
* Maximum of I-score (impairment score by MABC test) is 40. If I-score was higher and higher, physical awkwardness is larger and larger.

4. Reliability

MABC test concentrates on the reliability of the impairment scores in terms of their consistency over two-week period. Data were available on scores on the two testing of 12 young children as random sample. The correlation coefficient between testing and retesting was 0.925 ($p < 0.01$).

MABC checklist

Data were available on 20 young children's MABC checklist (10 young children with physical awkwardness and 10 age-matched controls). The correlation between MABC checklist and MABC test of young children with physical awkwardness was -0.620 ($p = 0.056$), while correlation of controls was 0.080 (n.s.). It was found that MABC checklist identified young children with physical awkwardness and did not identify young children not physically awkward with physically awkward accurately.

Conclusion

MABC Test (AGE BAND 1) identified 11.5 % of children as having physical awkwardness or being at risk, which was close to the value obtained in the United States. The test provided evidence of the validity of this figure as it successfully differentiated the selected children from age-matched controls who scored well on the checklist. Although some of the items need modification, the results suggest that MABC package is a workable research tool for children in early childhood in the Japanese context.

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Assessment of Functional Exercise Capacity and Exercise Training Using Cycle Ergometer in Patients with Cerebrovascular Disorder

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Introduction

Emphasis in stroke rehabilitation has been on improving self-care abilities through strength of muscle and training of coordination. Exercise is important for promoting fitness and preventing secondary disabilities due to inactivity in the physically disabled (Dearwater, LaPorte, & Cauley, 1985; Santiago, Coyle, & Kinney, 1993). Stroke patients, however, are known to have a low endurance to exercise, which may be compounded by the increased energy cost of movement associated with residual hemiparesis, and this may contribute to poor rehabilitation outcomes (Jorgensen, Nakayama, & Raaschou, 1993; Wade & Langton, 1987).

Recent studies have shown that aerobic exercise training is effective for the recovery of physical fitness in hemiparetic patients with cerebrovascular disorder (CVD) (Fujitani, Iashikawa, & Akai, 1999; Majima & Kondo, 1995; Potempa, Lopez, & Braun, 1995). Therefore, measuring and assessing the cardiorespiratory endurance of hemiparetic stroke patients is important for evaluating their potentiality in daily life.

The purpose of this study was to assess the improvement in functional exercise performance and oxygen uptake (VO2) kinetics in hemiparetic patients with CVD.

Methods

Subjects

Nineteen ambulatory hemiparetic patients with CVD (15 males and 4 females; 58±10 years old) participated in this study. The time interval from stroke onset to admission was 78±25 days. Subjects had mild-to-moderate hemiparesis including both an upper and lower limb, which was documented on physical examination. Grades of the Brunnstrom stage of individual lower extremity were from III to V. Each patient was independent in indoor gait and/or indoor wheelchair locomotion. Cerebral vascular events and affected locations were documented by a computed tomographic scan and medical diagnosis. All patients gave their informed consent for this study.

Study Design

1. Exercise training protocol

Each patient participated in the 8-week program of supervised exercise. They exercised on an adapted cycle ergometer for 20 minutes per session, five times a week, in addition to a conventional medical rehabilitation program by physical therapists at Hyogo Rehabilitation Center Hospital as inpatients.

We instructed the patients to exercise in moderate intensity aerobic exercise training program using bicycle ergometer for 8 weeks in addition to ordinary rehabilitation by physiotherapist.

2. The exercise testing system

This study used a symptom-limited test by using a ramp load system including an electromagnetically controlled cycle ergometer (Lode Corival WLP-400, Groningen, Netherlands). Some patients required assistance to start pedaling of the cycle ergometer, and some had to fix an affected hand on the handle bar by using an elastic bandage.

Each test began with 3 minutes of resting for the baseline measurement. After constant load work exercise at 20 W for 3 minutes, incremental loading of 10 W/min was started. The electrocardiogram and heart rate were monitored continuously with Fukuda ML-600 (Japan). The dynamic exercise test continued until an individual's maximal effort was achieved and exercise tests were repeated prior to the training program and immediately after the 8 weeks of training.

3. Kinetics measurement during exercise

Exercise metabolic parameters such as VO2 and work rate (WR) were continuously determined during the graded exercise test by using a breath-by-breath respiration gas analysis assembly with a gas analyzer (Minato RM-300, Japan). Maximum values for the exercise parameters were the maximum of averages of every 30 seconds.

On the stage of constant load, the time constant (τon) and O2 deficit were calculated from actual VO2 change using a statistical program (Dixon, 1983) which was used to fit a single exponential data curve from the onset of exercise to the end of the steady-state exercise (Figure 1). The peak oxygen uptake (peak VO2) and maximum work rate (max WR) were measured as parameters of exercise endurance abilities, forcing to maximal effort exercise on the incremental load, and ΔVO2/ΔWR was calculated as a parameter of efficiency of energy expenditure (Maeda & Itoh, 1997).

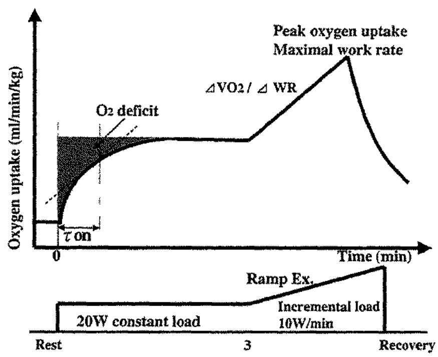

Figure 1: Protocol of Exercise Testing

Statistical Analysis

Data are shown as mean ±SD and paired Student's t-test was used for statistical analyses of the data. Statistical significance was accepted for values of p less than 0.05.

Results

The results of this study are summarized in Table 1. The τon and O2 deficit on the constant load after exercise training were lower than those in initial measurement by 15 % and 12 %, respectively (τon; $p < 0.05$, O2deficit; $p < 0.05$). On the incremental load, peak VO2 and max WR were significantly increased by 10 % and 16 %, respectively (peak VO2; $p < 0.05$, max WR; $p < 0.05$) and ΔVO2/ΔWR was significantly decreased by 11 % ($p < 0.05$).

Table 1: Effects of Physical Fitness and Exercise Endurance on Oxygen Uptake Kinetics Responses during Physical Fitness Training for Patients with CVD

	Before	After 8 weeks of Physical Therapy	*p* value
τon (sec)	28.5±10.2	19.3±8.0	$p<0.05$
O_2 deficit (ml)	225.5±129.7	127.1±56.2	$p<0.05$
peak $\dot{V}O_2$ (ml/min/kg)	16.7±3.8	18.4±3.8	$p<0.05$
max WR (watt)	77.2±26.6	91.6±24.0	$p<0.05$
$\Delta\dot{V}O_2/\Delta WR$ (ml/W)	13.8±2.6	12.6±1.5	$p<0.05$

Discussion

The evaluation of physical fitness and physical activities is important for patients with physical disabilities (Dearwater et al., 1985; Santiago et al., 1993). In clinical practice, the assessment of physical fitness is useful for advising patients about their life style and designing a rehabilitation program to maintain physical activities. It has been commonly reported that the physically disabled such as hemiplegic patients with CVD, could improve their physical fitness after aerobic exercise training (Fujitani et al., 1999; Majima & Kondo, 1995; Potempa et al., 1995). Oxygen uptake is the classic measure of overall cardiorespiratory fitness and peak VO2 describes the highest oxygen uptake obtained by an individual for a given form of exercise, despite increased effort and work. In contrast, VO2 kinetics shows the efficiency of the cardiorespiratory response to an imposed work demand. Specifically, VO2 kinetics describes the rate at which the cardiorespiratory system is able to deliver oxygen to skeletal muscles and the rate at which oxygen is consumed by skeletal muscles at the beginning of exercise (Hagberg, Nagle, & Carlson, 1978; Whipp, 1971). We have little information concerning whether the effect of endurance training on VO2 kinetics is influenced by the onset of submaximal exercise (Phillips, Green, & MacDonald, 1995).

In the present study, it was first demonstrated that the exercise endurance in ambulatory hemiparetic stroke patients was recovered for VO2 kinetics such as τon and O2 deficit at the onset of exercise. The rise to steady state is described by a τon, which is determined by fitting an exponential curve to VO2 kinetics data. A slow τon is a marker of impaired oxygen delivery and/or extraction. It takes longer for the individual with a slow τon to reach steady state. VO2 kinetics is influenced by a combination of cardiovascular and peripheral factors. Recent studies have been carried out to determine whether cardiac output, arteriovenous oxygen difference, aspects of skeletal muscle metabolism, or a combination of factors play a role in exercise (Weber, Kinasewitz, & Janicki, 1982).

The exercise training programs produced improvements in the physical fitness as represented by improvements of 10 % in peak VO2, 16 % in max WR and 11 % in ΔVO2/ΔWR, respectively. The recovery of exercise endurance resulted in the prolongation of the gait distance for 6 minutes in ambulatory hemiparetic patients with CVD (data not shown). These findings were in agreement with other studies published on exercise training programs for individuals with a physical disabilities (Berry & Moritani, 1985; Brown & Kautz, 1997; Tukagishi, Ikeda, & Takagi, 1993). These results suggested that the moderate intensity exercise training improve the functional exercise capacity and produce the energy efficacy on VO2 kinetics in hemiplegic patients with CVD.

In conclusion, this study demonstrates that low-intensity endurance training produces energy efficiency in VO2 kinetics and improves physical fitness among ambulatory hemiparetic patients with CVD.

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Pedometric Measurement of Daily Physical Activity and Oxygen Uptake Kinetics on Exercise Endurance with Ambulatory Post-Stroke Hemiplegics

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Introduction

Low rehabilitation endurance may compound the increased energy cost of movement associated with residual hemiparesis and may contribute to poor outcome (Dearwater, LaPorte, & Cauley, 1985). Impaired walking function greatly contributes to functional disability after stroke, and improved walking function is the goal most often stated by hemiplegics.

In clinical practice, the peak oxygen uptake (peak $\dot{V}O_2$) and the oxygen uptake ($\dot{V}O_2$) kinetics, which are the classic measures of overall cardiorespiratory fitness, are adequate parameters for determining the level of physical fitness of physical disabled persons (Potempa, Lopez, & Braun, 1995; Santiago, Coyle, & Kinney, 1993). Specifically, $\dot{V}O_2$ kinetics describe the rate at which the cardiorespiratory system is able to deliver oxygen to skeletal muscle with low level constant work rate at the beginning of exercise. The rise to steady state is described by a time constant, £non, which is determined by fitting an exponential curve to $\dot{V}O_2$ kinetics data. A slow £non is a marker of impaired oxygen delivery and/or extraction in patients with chronic heart diseases and cardiovascular diseases (Hagberg, Nagle, & Carlson, 1978; Phillips, Green, & MacDonald, 1995).

The purposes of this investigation were to (1) describe the amount of walking steps in daily physical activity at home and (2) assess whether it was related to the exercise endurance described by $\dot{V}O_2$ kinetics responses using not only the maximal exercise but also the submaximal exercise at a low level constant work rate in chronic stroke patients.

Methods

Subjects

Twenty hemiparetic stroke patients (16 male and 4 female ; 64±9 years old) living in the community participated in this study. Their body mass index was 23.1±1.8 kg/ m^2 and the time interval from stroke onset to study was 22±12 months. Subjects had mild to moderate hemiparesis, including both an upper and lower limb, which was documented on physical examination. Grades of the Brunnstrom's stage of individual lower extremity were from III to V. Each patient was independent in indoor and/or outdoor gait with prosthesis.

Pedometric Analyses in Daily Physical Activity

In the present study, a compact ambulatory calorimeter (Kenz Life Corder, Suzuken Co, Nagoya, Japan) equipped with an acceleration sensor was used. It was designed to detect the acceleration rate along the vertical axis at the waist during body movements and automatically calculate walking steps and energy expenditure (Nimi & Hasegawa, 1992). The number of walking steps and amount of energy expenditure during daily physical activities were measured continuously from the time it was put on at 7:30 a.m. to the time it was taken off at 9:30 p.m. To minimize day-to-day variation in daily gait, steps for 12±4 consecutive days were obtained in this study. During the measurement period, subjects were instructed to continue their ordinary daily routine.

Oxygen Kinetics Measurement During Exercise Testing System

In this study we used a symptom-limited ramp exercise test with a load test system including an electromagnetically controlled cycle ergometer (Lode Corival WLP-400, Groningen, Netherlands) (Katoh, Hirayama, & Murakami, 2001). Each test began with 3 min of resting baseline measurement. After the constant load work exercise at 20 W for 3 min, incremental loading of 10 W/min was started. On the stage of constant load, τon and O_2 deficit were calculated from actual $\dot{V}O_2$ changes using a statistical program, which was used to fit a single exponential data curve from the onset of exercise to the end of the steady-state exercise. Exercise metabolic parameters such as $\dot{V}O_2$ and work rate were continuously determined during the graded exercise test using a breath-by-breath respiration gas analysis assembly with a gas analyzer (Minato RM-300, Japan). Peak $\dot{V}O_2$ and maximal work load were measured as parameters of endurance abilities, forcing individually to maximal effort exercise on the incremental load.

Statistical Analysis

Data are shown as mean ±SD. Linear regression analysis was used to correlate data, which were considered statistically significant at $p < 0.05$.

Results

Figure 1 shows the results of gait performance of daily activity at home in ambulatory post-stroke hemiplegics.

The number of walking steps and amount of exercise energy expenditure, which was measured by a caloriecounter in daily physical activity with ambulatory hemiplegia, were 4346±2933 steps/day and 112±82 kcal/day.

The relationships between the daily walking steps and $\dot{V}O_2$ kinetics at the onset of exercise is shown in Figure 2. There were negative correlations between the amount of daily walking steps and τon, as well as the oxygen deficit at the onset of exercise (τon ; $r = -0.52$, $p < 0.05$, oxygen deficit ; $r = -0.61$, $p < 0.01$).

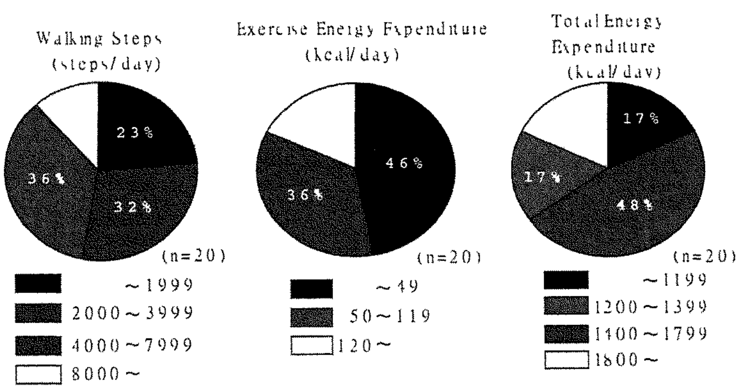

Figure 1: The Gait Performance of Daily Physical Activity at Home in Ambulatory Post-Stroke Hemiplegia

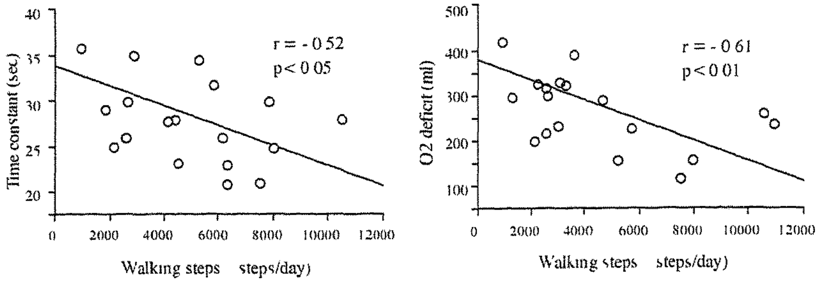

Figure 2:The Relationships between the Gait Performance and the Oxygen Uptake Kinetics at the Onset of Submaximal Exercise in Ambulatory Post-stroke Hemiplegia

The relationships between the daily walking steps and $\dot{V}O_2$ kinetics at the ramp exercise test are shown in Figure 3.

There were positive correlations between the amount of daily walking steps and the peak $\dot{V}O_2$, as well as the maximal work load (peak $\dot{V}O_2$; $r = 0.61$, $p < 0.01$, maximal workload; $r = 0.69$, $p < 0.01$).

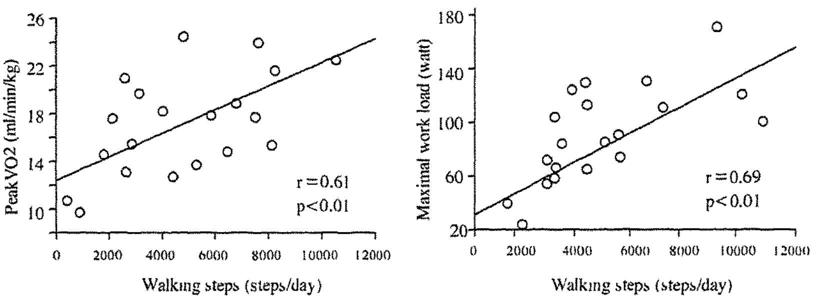

Figure 3:The Relationships between the Gait Performance and Physical Fitness at the Maximal Exercise in Ambulatory Post-stroke Hemiplegia

Discussion

Elevated energy requirements of hemiparetic gait are of particular concern among the elderly, for whom advancing age and residual neurological deficits promote a sedentary life-style leading to declining cardiovascular fitness, disuse atrophy and weakness (Fujitani, Ishikawa, & Akai, 1999; Kochersberger, McConnell, Kuchibhatla, & Pieper, 1996). The evaluation of physical fitness and physical activities are important for patients with physical disabilities (Potempa et al., 1995). The number of walking steps by post-stroke patients obtained in our study was similar to those of previous studies (Jorgensen, Nakayama, & Raaschou, 1993; Kohzuki, Yokogawa, & Gotoh, 2001).

In clinical practice, the assessment of physical fitness is useful for advising patients about their life style and designing a rehabilitation program for maintaining physical activities. It has been commonly reported that adults with physical disabilities, including those with hemiplegia, improve their physical fitness after aerobic exercise training (Tukagishi, Ikeda, & Takagi, 1993). Oxygen uptake is the classic measure of overall cardiorespiratory fitness and peak VO2 describes the highest oxygen uptake obtained by an individual for a given form of exercise despite increased effort and work. In contrast, the oxygen uptake kinetics show the efficiency of the cardiorespiratory response to an imposed work demand. Specifically, oxygen uptake kinetics describes the rate at which the cardiorespiratory system is able to deliver oxygen to skeletal muscle and the rate at which oxygen is consumed by skeletal muscle at the beginning of exercise (Brown & Kautz, 1997). We have little information regarding whether the effect of endurance training on oxygen uptake kinetics is influenced at the onset of submaximal exercise. The rise to steady state is described by a time constant τon, which is determined by fitting an exponential curve to oxygen uptake kinetics data. A slow τon is a marker of impaired oxygen delivery and/or extraction. Oxygen uptake kinetics is influenced by a combination of cardiovascular and peripheral factors. Recent study has been directed at determining whether cardiac output, arteriovenous oxygen difference, aspects of skeletal muscle metabolism, or a combination factors play a role in exercise.

The present study showed that the number of daily walking steps was negatively related to τon, as well as the oxygen deficit at the onset of exercise, and was positively correlated with peak VO2, as well as the maximal work load with gas analysis.

These results suggest that the gait performance of daily physical activity at home is generally related with exercise endurance in ambulatory post-stroke hemiplegia. The investigation also showed that the number of walking steps in daily physical activity was related to the exercise endurance by VO2 kinetics responses using not only maximal exercise but also submaximal exercise at a low level constant work rate in chronic stroke patients.

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A Study of the Use of Recreational Sports During Summer Vacation for Junior High School Students with Mental Retardation at Special Schools in Kaohsiung

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Introduction

The 21st century is the recreational age. Proper recreational sports are not only good to the physical and mental health, but also able to facilitate personal growth in a positive way.

As far as the educational phase is concerned, the mentally retarded students in the junior high level are just in an age when the body and mind rapidly develop, like general youth. Recreational activities can promote the chance by which the mentally retarded students can interact with others (Lu, 1986; Tu, 1995). Recreational activities are characterized by such functions as helping individuals relax the living stress, promoting the physical and mental health, cultivating personality, enhancing the social interpersonal interaction and developing actions, recognition and social emotions (Chang & Sun, 1995; Chen, 1986; Chuang et. al., 1990).

Notwithstanding, the mentally retarded students cannot carry out effective communication with people on account of the slow development of their own movements as well as the retardative progress of languages. On top of that, their ability is so limited that it is not easy for them to understand the rules of the group activities. Moreover, they will behave so abnormally as to be in great difficulty in adapt themselves to the society. As a result, their capability for participating in the recreational sports is confined (Wang, 1992; Hu, 1992).

Pursuant to a great deal of studies organized by the Department of Special Education (Education Service Center, Region X, Richardson, Texas, 1988), the mentally retarded students are often faced with the serious regression during the summer vacation. In the beginning of the new semester, in addition to the instructions required for progressing into the new curricular contents, they even spend substantial time and efforts in reviewing the old curriculum.

In consequence, this study explores each condition wherein the mentally retarded students participate in the recreations during the summer vacation in terms of such three aspects as the current state, the hindrance as well as the needs of the mentally retarded students' participation in the recreational sports. On those bases, concrete suggestions are brought forward for parents, schools and the competent authorities to refer to when they conduct the recreational counseling.

Purpose

1. To understand the current state of the mentally retarded students' participation in the recreational sports during the summer vacation.
2. To explore the factors which hinder the mentally retarded students from taking part in the recreational sports.
3. To realize the mentally retarded students' needs for participating in the recreational sports during the summer vacation.
4. To provide the decision-making authority concerned with the study results for their reference when they establish, improve and guide the recreational sports policies for the mentally retarded students.

Statement of Problems

In order to attain the foregoing study objective, the following study issues are identified in this study:

1. How do the mentally retarded students of the junior high level with the special school participate in the recreational sports during the summer vacation?
2. What are the factors which hinder the mentally retarded students of the junior high level with the special school from partaking in the recreational sports during the summer vacation?
3. What are the needs of the mentally retarded students of the junior high level with the special school for taking part in the recreational sports?

Methods

The methods on this study were documents analyses and surveys. There were three aspects:

1. The students' information;
2. The current states of students' participating in the recreations;
3. The parents' cognition and needs on participating in the recreations.

The total subjects from two special education schools including students and parents were 109. Using SPSS10.0 for Windows undertook analyses.

Results

All results are shown in the following tables.

Table 1: The Statistic Data of the Times on Joining the Recreational Sports

	None	1	2-3	4-5	6-7	7 and up	Sum
No. of Times	39	18	30	15	1	6	109
Percentage	35.8	16.5	27.5	13.8	0.9	5.5	100

Table 2: The Statistic Data of Expenditure on Recreation Per Month Per Family

	None	Below NT1000	NT1001-2000	NT2001-3000	NT3001-4000	NT4001-5000	NT5001 up	Sum
Questionnaires	30	20	10	9	1	0	1	71
Percentage	42.3	28.2	14.1	12.7	1.4	0	1.4	100

Table 3: The Statistic Data of Paying or Not Paying for Participating the Recreations

	Paying	Not Paying	Sum
No. of Times	50	21	71
Percentage	70.4	29.6	100

Table 4: The Statistic Data of the Contents for Participating in Recreational Sports

	Ordinary Students' Activities	Activities Designed for M.R. Students	Activities for all Types of Handicapped	Sum
Questionnaire	9	51	11	71
Percentage	12.7	71.8	15.5	100

Table 5: The Statistic Data of the Places for the Recreational Sports

	Schools	Parks	Stadiums	Scenic Places	Gym	Multi-Gym	Overseas	Others	Sum
No. of Times	5	27	12	2	4	19	1	1	71
Percentage	7	38	16.9	2.8	5.6	26.8	1.4	1.4	100

Table 6: The Statistic Data of the Companies in Participating in Recreational Sports

	Alone	Family, Relatives	Neighbors	Friends, Classmates	Teachers	Sum
Questionnaires	6	48	1	10	6	71
Percentage	8.5	67.6	1.4	14.1	8.4	100

Table 7: The Statistic Data of Where to Get the Information of Recreational Sports

	Newspaper, Magazine	Television	Leaflets	Internet	Outdoor Signs	Relatives	Schools	Corporate Bodies	Sum
Questionnaires	9	10	4	3	0	13	20	12	71
Percentage	12.7	14.1	5.6	4.2	0	18.3	28.2	16.9	100

Table 8: The Statistic Data of Obstacle Factors for M.R. Students Participating in the Recreational Sports

Items	No. of people	Percentage	Ranking
Safety consideration	46	18.7	1
Inconvenient transportation	39	15.8	2
Lack of Sport Skills	33	13.3	3
Lack of Time	30	12.2	4
High-priced	21	8.5	5
No guides	20	8.1	6
No Companies	13	5.2	7
Lack of Information	12	4.9	8
Lack of energy	11	4.5	9
Lack of Family Supports	10	4	10
Lack of Places	6	2.4	11
No interests	6	2.4	12

Table 9: The Statistic Data of the Purpose for Participating in the Recreation

	Healthy	Happy	Kill Time	Social Exper.	Sports Skills	nAch	Stress Release	Changing View of Life	Chase Knowledge	Sum
Questionnaire	60	18	4	7	16	1	1	0	2	109
Percentage	55	16.5	3.7	6.4	14.7	0.9	0.9	0	0.8	100

Table 10: The Statistic Data of Choosing Sponsors Taking Charge of the Recreations

	Social Clubs	Schools	Private Institutions	Government	Others	Sum
Questionnaire	29	74	5	1	0	109
Percentage	26.6	67.9	4.6	0.9	0	100

Table 11: The Statistic Data of the Suitable Days for Recreational Sports Camps

	3 Days	1 Week	2 Weeks	3 Weeks	4 Weeks	1 Month Up	Sum
Questionnaires	41	25	14	16	3	10	109
Percentage	37.6	22.9	12.8	14.7	2.8	9.2	100

Table 12: The Statistic Data of the Payment Per Day for Participating in Recreations

	Not Paying	Below NT100	NT101-200	NT201-300	NT301-400	Up NT401	Sum
Questionnaire	40	32	20	13	40	0	109
Percentage	36.7	29.4	18.3	11.9	3.7	0	100

Table 13: The Statistic Data of Professional Counselors' Capabilities

	Playing w/ kids	Sports' Methods and Rules	Directing and Using Facilities	Safety Consideration	Video Tapes Presentation	Sum
Questionnaires	3	57	10	37	2	109
Percentage	2.8	52.3	9.2	33.9	1.8	100

Table 14: The Statistic Data of Knowing Where to Get the Information of the Recreational Sports

	Newspaper Magazines	Television	Leaflets	Internet	Outdoor Signs	Relatives	Schools	Sum
Questionnaires	11	13	3	5	4	3	70	109
Percentage	10.1	11.9	2.8	4.6	3.7	2.8	64.2	100

Table 15: The Statistic Data of Needs of Building Recreational Sports Stadiums

	Large Stadium Park	Median Stadium Park	Community Sport Park	Physical Training Stadium	Public Amusement Park	Multi-Gym	Sum
Questionnaires	18	7	56	18	8	2	109
Percentage	16.5	6.4	51.4	16.5	7.3	1.8	100

Table 16: The Top Five of the Most Popular Recreational Sports

Categorization	Items	Ranking	Percentage
Balls Sports	Basketball	1	11.2
	Dodge Ball	2	
	Bowling	3	
	Tchoukball	4	
	Hockey	5	
Outdoor Activities	Picnic	1	57.9
	Hiking	2	
	Mountaineering	3	
	Hot spring Bath	4	
	Forest Bath	5	
Folks Exercises	Kiting	1	14
	Swinging	2	
	Child Play	3	
	Diabolo	4	
	Jump Rope	5	
Dance	Rhythmic Dance	1	4.4
	Aerobic Dance	2	
	Folk Dance	3	
	National Dance	4	
	Disco	5	
Calisthenics	Patulous Exercises	1	3.6
	Gymnastics	2	
	Yoga	3	
	Heavy Training	4	
	Chi-Kung	5	
Martial Art	Taijichuan	0	0
	Karate	0	
	Chinese Kung-fu	0	
Aquatic Sports	Swimming	1	8.9
	Diving	2	
	Water polo	3	
	Rowing Boats	4	
	Going Boating	5	

Table 17: The Top Five of the Most Prefer to Participate in the Recreational Sports

Categorization	Items	Ranking	Percentage
Balls Sports	Basketball	1	13.5
	Bowling	2	
	Badminton	3	
	Dodge Ball	4	
	Football	5	
Outdoor Activities	Picnic	1	58
	Walking	2	
	Hiking	3	
	Rollerblade	4	
	Jogging	5	
Folks Exercises	Swinging	1	11.6
	Kiting	2	
	Child Play	3	
	Jump Rope	4	
	Diabolo	5	
Dance	Rhythmic Dance	1	5.6
	National Dance	2	
	Aerobic Dance	3	
	Folk Dance	4	
	Disco	5	
Martial Art	Patulous Exercises	1	3.6
	Gymnastics	2	
	Yoga	3	
	Heavy Training	4	
	Chi-Kung	5	
Calisthenics	Taijichuan	1	0.1
	Karate	0	
	Chinese Kung-fu	0	
Aquatic Sports	Swimming	1	7.6
	Diving	2	
	Others	3	
	Rowing Boats	4	
	Going Boating	5	

Conclusions

The main findings of this study are listed as follows:

1. In respect of the current state of the mentally retarded students' participation in the recreational sports during the summer vacation.

(1) The times for the mentally retarded students' participation in the recreational sports during the summer vacation are obviously insufficient, and the families which do not arrange such an expenditure also reach 42.3 %.

(2) Currently 70.4 % of the authorities in charge of the mentally retarded students' participation in the recreational sports charge fees, while 66.1 % of the parents hope that such a participation can be free of charge or subsidized.

(3) A majority of the contents of the recreational sports in which the mentally retarded students take part are those which are specially designed for them. The items of recreational sports to be participated in are in this sequence: outing, hiking, walking, swimming, basket playing, kiting, swinging, mountaineering, hot spring bath and biking.

(4) Most of the places where recreational sports are done are parks and the companions when doing the recreational sports are mainly families.

(5) The avenue by which the information of the recreational sports is accessed is mainly the school's notification. The use of the modern internet information appears lacking.

2. In respect of factors which hinder the mentally retarded students' participation in the recreational sports during the summer vacation, the safety consideration and the inconvenient transportation are the main causes which affect the mentally retarded students' participation in the recreational sports. It is worthy of further study by the authority concerned. The student's personal lack of the sports skills and the insufficiency of parents' time are the second reasons. Obviously, the difficulty which the mentally retarded students encounter in participating in the recreational sports results greatly from the personal factors, in addition to consideration for safety and inconvenient transportation. It is a key point for the authority concerned to take into consideration when they organize the recreational sports.

3. In respect of parents' recognition and needs for the mentally retarded students' participation in the recreational sports during the summer vacation:

(1) Participation in the recreational sport during the summer vacation is designed to promote the physical and mental health.

(2) For the selection of the authority-in-charge, 67.9 % take the first preference for the schools; the short-term class in terms of the days for the activities is favored by parents. For either domestic or overseas activities, parents consider one week as suitable. As far as the fee payment is concerned, 66.1 % of the parents esteem the daily charge for the sponsored activities shall be less than NT$100.

(3) The top ten favorite items of the recreational sports which they wish to participate in are outing, walking, swimming, basketball playing, hiking, inline skating, jogging, hot spring bath, hula loop and green shower.

(4) A majority of the mentally retarded students need their families or relatives to be their companions when they take part in the recreational sports.

(5) Parents think that the counselors should take first priority for guiding the sporting methods, rules and safety maintenance.

(6) The students' parents wish to obtain the related information on the recreational sports from schools.

(7) The needs for the recreational sports grounds are urgently directed to the construction of the community sports park.

Suggestions

According to each conclusion reached on the basis of this study information and results, we summarize and propose the following suggestions:

Authority-in-charge and the Contents of Activities

Because the mentally retarded students will have the sense of safety in a familiar environment, the schools should organize the recreational sports camps as many as possible in order to bring more opportunities for them to take part in the activities. When organizing the activities, they should take into consideration transportation, accommodation and parents' economic situation. In principle, no fee should be charged. They should do their best to acquire subsidy or other social resources in favor of more students to participate in the appropriate recreational sports. The sports items they wish to learn most include: outing, walking, swimming, basketball playing, hiking, inline skating, jogging, hot spring bath, hula loop and green shower. Consequently the competent authority can consider these items when hosting the activities so as to increase the mentally retarded students' intention to participate in them.

Needs for the Counselors and Participating Companions

The mentally retarded students need more care and counseling than the general students. Accordingly when the sponsoring authority hosts the activities, they should actively train and arrange the counselors who shall in turn offer the full service and put emphasis on the sporting method, the rule interpretation and the safety maintenance. The companions who accompany them to do the recreational sports are likely to be those people with whom they are familiar in the surroundings, such as relatives, classmates, teachers, etc. Therefore, it is encouraged that teachers and students jointly take part in the sports, in keeping with the counselor's assistance. As such the quality of the mentally retarded students' participation in the activities can be enhanced with the learning effects reinforced.

Information Accessibility and Grounds

Because the social-economic status of the mentally retarded students' parents is relatively lower, the approach for the information accessibility is also fewer. The school is an important channel for them to access the information. As a result, the school should give more publicity to the related activity information so that the mentally retarded students can have more choices when taking part in the activities. Regarding the needs for the grounds, the most urgent thing is to build the community sports park. It should be taken into key point consideration when the authority concerned evaluates the feasibility of the construction of the sports facilities for the purpose of facilitating the recreational sports for the mentally retarded students.

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Double Product during Isometric Muscle Contraction in the Elderly

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Introduction

The double product (DP) or rate-pressure product, systolic blood pressure (SBP) multiplied by heart rate (HR), is considered to be an indirect indicator of cardiac workload (Campbell et al., 1995, 1997). The DP is used increasingly today in medical and sports science to assess the function of the heart and the severity of coronary heart disease, because it provides a noninvasive, easily measurable predictor of myocardial oxygen consumption (Jorgensen, 1972; Jorgensen et al., 1973; Kitamura et al., 1972). Previous studies have demonstrated that DP is influenced by a variety of internal and external factors such as gender, autonomic nervous system tone, hematologic and renal variables, ambient temperature and humidity, and emotional state.

Dynamic physical activity is one of the most important factors for the DP, because during dynamic physical activity both SBP and HR increase dramatically with the increase in workload. On the other hand, the increase in HR during isometric (static) exercise is less pronounced compared to dynamic exercise, although isometric physical activity elicits marked increases in SBP (Lind et al., 1966). In comparing the young and the elderly, some investigators have observed difference of SBP and HR responses to isometric exercise (Daida et al., 1996; Sagiv et al., 1988; Smolander et al., 1998). It was found that the elderly showed a lower HR (Petrofsky & Lind 1975; Taylor et al., 1995) and a greater SBP (Petrofsky & Lind 1975; Smolander et al., 1998) during isometric exercise than the young. From these results, it is expected that during isometric contraction the elderly may show increased DP compared with the young. However, there have been no studies that systematically investigated the DP responses of the elderly to an increase in workload during isometric exercise.

In this study, therefore, we compared the DP response of the elderly with that of the young during isometric muscle contraction in sitting and standing positions.

Methods

Subjects

Eight old and nine young males volunteered to participate in this study. The characteristics of the subjects are shown in Table 1. They were normotensive and healthy with no history of cardiovascular disorders. None were specifically arm trained. Before the experiment, informed consent was obtained from all subjects.

Table 1: Characteristics of Subjects

		Height (cm)	Body Mass (kg)	Age (years)	MVC(kg)	
					Sitting	Standing
Young	Mean	173.0	66.3	24.8	27.3	31.9
	S D	4.1	7.0	3.6	5.6	5.9
Elderly	Mean	163.7	61.8	66.4	23.6	27.7
	S D	4.1	6.8	5.1	7.1	5.8

MVC denotes maximum voluntary contraction.

Experimental Procedure and Physiological Measurements

On arrival at the laboratory for the experiment, subjects rested quietly for 30 min. In the sitting experiment, the subjects were asked to sit for a further 5 min and in the standing experiment, to stand up for 5 min. At the end of this period, resting HR and SBP were recorded (STBP-780, Colin Co. Ltd., Japan). After that, the subject performed the isometric exercise for 2 min in the sitting or standing position with a 5 min recovery period. The isometric exercise involved the contraction of the biceps brachii against a load (1, 3 or 5 kg) applied to the wrist downwards with the elbow at 90 degrees and the forearm horizontally in supination. The dominant arm was used for the exercise and HR and SBP were measured from the opposite arm.

Statistics

Means and standard deviations were calculated for all variables in young and elderly groups. The one-way Kruskal-Wallis analysis of variance (ANOVA) was used for statistical comparison among the workloads and between the subject groups. When a significant difference was found in the ANOVA, the difference between means was tested with the Mann-Whitney test. All p values less than 0.05 were considered significant.

Results and Discussion

Table 2 shows the mean HR for the last minute during the isometric exercise in the young and the elderly group. Although there was no statistical significance, the HR of the young in standing was consistently greater than that in sitting. Furthermore, the HR of the young was fairly constant irrespective of workload. In contrast to the young, there was no difference in HR between sitting and standing in the elderly. In general, the venous return to the heart decreases in standing because of the hydrostatic effect. In this case, stroke volume decreases and HR increases to compensate for this reduction. Compared to the elderly, the young demonstrated greater HR for both sitting and standing. A significant difference in HR between the young and the elderly was found at the workload of 5 kg in the standing experiment ($p < 0.05$). This is in accord with the findings of Petrofsky and Lind (1975), Smolander et al. (1998) and Taylor et al. (1995). It has been shown that the smaller increase in HR during isometric exercise in the elderly is associated with a reduced baseline vagal tone and to lesser vagal withdrawal (Taylor et al., 1995).

Table 2: Mean and Standard Deviation of Heart Rate (beat per minute) at the End of Exercise

Work load	Young		Elderly	
(kg)	Sitting	Standing	Sitting	Standing
1	74.3±10.1	83.4±14.7	71.1±6.4	72.6±7.0
3	77.0±10.8	82.9±13.5	72.3±5.6	75.1±7.2#
5	76.8±9.1	84.0±15.5	74.1±4.0	72.5±7.8*

#$p < 0.05$; 1kg vs 3 kg
*$p < 0.05$; Young vs Elderly

Table 3 shows mean SBP at the end of the isometric exercise. On the whole, the elderly showed greater SBP than the young, although in sitting there were no significant differences between the young and the elderly. In standing, the elderly showed significantly greater SBP at the workload of 5 kg ($p < 0.05$) than the young. SBP at 5 kg in sitting was slightly greater than other workloads in both the young and the elderly, although no significant differences were found. In the elderly, SBP increased significantly with the increment in workloads, while the young showed a significant increase in SBP at 5 kg compared to 1 and 3 kg. These results indicated that the heavier the workload, the greater the difference in SBP between young and elderly. In contrast to this finding, Ordway and Wekstein (1979) have demonstrated that aging was associated with a decreased blood pressure during isometric exercise. On the other hand, in accordance with our results, Petrofsky and Lind (1975) and Smolannder et al. (1998) showed that older subjects had a higher SBP response than their young counterparts. These differences in results may be attributable to variations in subject population, experimental protocol or the muscle group tested.

The greater increase in SBP in the elderly might have been due to age-related changes in baroreflex function. As pointed out by Rowell (1993), baroreflexes oppose an increase in blood pressure by increasing vagal activity to the heart and in the elderly the activity of baroreflexes may be reduced (Taylor et al., 1995). Another explanation for the greater SBP in the elderly is a greater sympathetic activation from the chemosensitive fibers in the active muscles (Rowell, 1993).

Table 3: Mean and Standard Deviation of Systolic Blood Pressure (mmHg) at the End of Exercise

Work load	Young		Elderly	
(kg)	Sitting	Standing	Sitting	Standing
1	131.4±15.8	123.8±16.6	134.8±14.4	127.6±12.8
3	126.9±14.5	126.2±15.6	147.0±15.2	137.8±12.0†
5	140.2±14.6	135.2±14.4*#	153.1±12.9	150.5±17.2*‡

†$p < 0.05$; 1kg vs 3kg, *$p < 0.05$; 1kg vs 5kg,
#$p < 0.05$; 3kg vs 5kg, ‡$p < 0.05$; Young vs Elderly

Table 4 presents the mean DP at the end of the isometric exercise for 2 min. The elderly showed significant differences in DP between 1 and 3 kg ($p < 0.05$), while the young showed similar DP at the workload of 1 and 3 kg. In both groups, a significant increase in the DP was found between 1 and 5 kg in sitting and standing. Furthermore, in both groups, the DP at 5 kg was the greatest and about 11000 mmHg•beats•min^{-1}, i.e. one third of maximal exercise DP (Hui et al., 2000). The DP in the elderly increased with increasing workload, although there was no significant difference between 3 and 5 kg. This increase seemed to be associated with the change in SBP.

Table 4: Mean and Standard Deviation of Double Product (mmHg beats per min) at the End of Exercise

Work load	Young		Elderly	
(kg)	Sitting	Standing	Sitting	Standing
1	9758±1685	10261±1799	9595±1471	9238±1070
3	9727±1451	10372±1472	10618±1343#	10324±1115#
5	10743±1513†**	11328±2196*	11353±1159*	11236±992*

#$p < 0.05$; 1 vs 3kg, †$p < 0.05$; 3 vs 5kg
*$p < 0.05$; **$p < 0.01$; 1 vs 5kg

There were no significant differences in the DP between young and elderly at any workload. This is one of the interesting findings in this study. Smolander et al. (1997) investigated HR and blood pressure responses during isometric contractions using the finger flexor muscles (handgrip) and the quadriceps muscle (one-legged knee extension) at 20, 40, and 60 % of the maximal voluntary contraction. In accordance with our results, they showed that the elderly showed a lower HR and a higher blood pressure response than the young and the differences were more apparent at a higher force level. Therefore, the similar DP in the young and the elderly found in the present study was attributable to the opposing responses of HR and blood pressure with aging.

Conclusion

1. The elderly subjects had a lower HR response than their young counterparts during isometric exercise.
2. In general, the elderly showed greater SBP compared to the young and a significant difference was found at the highest workload (5 kg).
3. There were no differences in DP between the young and the elderly at all workloads, because the elderly showed a lower HR and a higher SBP than the young.

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Early Childhood Gymnastics Award Scheme

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Introduction

Physical activity is considered as one out of the ten leading health indicators of the public health. (U.S. Department of Health and Human Services, 2000). The Surgeon General's report on physical activity and health concluded that moderate physical activity could reduce substantially the risk of developing illnesses such as heart disease, diabetes, colon cancer, high blood pressure, breast cancer and lower back pain (National Center for Chronic Disease Prevention and Health Promotion, 1996). However, as of 1997, 85 percent of adult did not engage regularly in moderate physical activity. (U.S. Department of Health and Human Services, 2000). Similar situation has been found in Hong Kong, the Hong Kong Sports Development Board (2000) reported that only an average of 44 % of the adult (15 years and older) population participated in at least one physical activity in 2000. This was lower than the 54 % in 1998 and the 45 % in 1999. Hong Kong Department of Health (2002) also supported the proven benefits of regular physical activity, while physical inactivity was common in Hong Kong. In addition, researches supported the view that engaging in physical activity / exercise could improve one's health and lower the health care cost. Louie (2001) reported that the average monthly medical costs for inactive respondents were HK$302, while the amounts for the active groups were HK$228. Hong Kong Sports Development Board (2002, March, 8) pointed out that long-term strategy is needed to encourage more people to take part in physical activities.

The aims of the present program were to encourage young children to participate in physical activity by general gymnastics, to educate teachers and parents knowledge in general gymnastics and physical fitness, and to develop the physical fitness profile for young children.

Method

The Early Childhood Gymnastics Award Scheme was conducted from August 2000 to March 2002 and was funded by the Quality Education Fund. This Scheme consisted of two kindergarten teachers training courses, physical fitness testing sessions for children, fun day in general gymnastics and the general gymnastics award scheme.

Procedures

1. Teacher training courses

The promotion of the teacher training courses was sent to kindergartens. The duration of each course was 22 hours. The course contents consisted of introduction of general gymnastics, fundamental motor development for children, physical fitness testing, gymnastic movements with ball, hoop, rope, and scarf. Teachers were encouraged to utilize the gymnastics movements and created their group routines in general gymnastics at the conclusion of the course. Questionnaires were administered to gather feedback from teachers.

2. Physical fitness tests

Physical fitness testing sessions were conducted by students from the Physical Education Department at kindergartens. The content of the physical fitness tests was the followings: height, weight, body mass index, waist and hip measures, percentage body fat, sit and reach test, standing long jump test and stork balance test.

3. Fun day in general gymnastics

Two fun days were conducted for children who were taking part in this program. Performance in general gymnastics and physical fitness tests were conducted in Kowloon and Taipo.

4. Gymnastics award scheme

The gymnastics body movements and the gymnastic stunts with ball, hoop, rope and scarf were grouped into Gold, Silver and Bronze Awards. Certifications were given to children who had successfully performed the stunts. In addition, funding was provided to the target kindergartens to improve their equipment in gymnastics.

Results

Teacher Training Courses

Over 50 teachers from 30 kindergartens participated at two general gymnastics training courses. Positive feedback such as: the content of the scheme was new, and creative was received. Teachers would like to have more time to learn more about gymnastics movements.

Physical Fitness Tests

Physical fitness testing sessions were conducted at 8 kindergartens and the measures were: height, weight, body mass index, waist and hip measures, percentage body fat, sit and reach test, standing long jump test and stork balance test. 680 children (M = 337, F = 343) participated at the physical fitness tests and the physical fitness profiles for young children in Hong Kong are listed in Table 1 and Table 2.

Table 1: Physical Fitness Profile for Children in Hong Kong (Female)

Test	Stage \ Age	3 years and 11 months or below	4 years to 4 years and 11 months	5 years to 5 years and 11 months	6 years or above
Body mass index (Kg/ m²)	5	≤14.6	≤14.1	≤13.7	<12.9
	4	14.7-15.6	14.2-15.0	13.8-14.4	13.0-14.1
	3	15.7-16.3	15.1-15.8	14.5-15.4	14.2-15.1
	2	16.4-17.9	15.9-17.5	15.5-18.3	15.2-17.8
	1	≥18	≥17.6	≥18.4	≥17.9
Body fat (mm) (Triceps & Calf)	5	≤17	≤17	≤18	≤17
	4	18-21	18-20	19-21	18-19
	3	22-23	21-23	22-24	20-21
	2	24-28	24-27	25-31	22-29
	1	≥29	≥28	≥32	≥30
Waist to hip ratio	5	≤0.81	≤0.82	≤0.81	≤0.8
	4	0.82-0.85	0.83-0.87	0.82-0.85	0.81-0.86
	3	0.86-0.87	0.88-0.89	0.86-0.89	0.87-0.90
	2	0.88-0.92	0.90-0.92	0.90-0.92	0.91-0.94
	1	≥0.93	≥0.93	≥0.93	≥0.95
Sit and reach (cm)	5	≥35	≥35	≥37	≥37
	4	32-34	33-34	32-36	32-36
	3	30-31	31-32	28-31	29-31
	2	27-29	28-30	25-27	25-28
	1	≤26	≤27	≤24	≤24
Standing long jump (cm)	5	≥64	≥89	≥95	≥111
	4	39-63	66-88	76-94	79-110
	3	31-38	56-65	65-75	72-78
	2	23-30	44-55	51-64	68-71
	1	≤22	≤43	≤50	≤67
Stork balance (seconds)	5	≥25	≥35	≥89	≥247
	4	8-24	19-34	25-88	25-246
	3	5-7	11-18	13-24	11-24
	2	3-4	4-10	7-12	5-10
	1	≤2	≤3	≤6	≤4

*Stage "5" represent the best performance, while Stage "1" represent acceptable performance.

Table 2: Physical Fitness Profile for Children in Hong Kong (Male)

Test	Age / Stage	3 years and 11 months or below	4 years to 4 years and 11 months	5 years to 5 years and 11 months	6 years or above
Body mass index (Kg/ m²)	5	≤14.5	≤14.5	≤14	<14
	4	14.6-15.1	14.6-15.0	14.1-14.6	14.1-14.8
	3	15.2-15.9	15.1-15.7	14.7-15.4	14.9-15.8
	2	16-17.8	15.8-17.8	15.5-18.4	15.9-18.2
	1	≥17.9	≥17.9	≥18.5	≥18.3
Body fat (mm) (Triceps & Calf)	5	≤16	≤15	≤15	≤15
	4	17-18	16-17	16-18	16-17
	3	19-20	18-20	19-22	18-22
	2	21-27	21-26	23-29	23-37
	1	≥28	≥27	≥30	≥38
Waist to hip ratio	5	≤0.83	≤0.83	≤0.83	≤0.80
	4	0.84-0.88	0.84-0.87	0.84-0.87	0.81-0.84
	3	0.89-0.90	0.88-0.90	0.88-0.87	0.85-0.87
	2	0.91-0.93	0.91-0.92	0.91-0.93	0.88-0.91
	1	≥0.94	≥0.93	≥0.94	≥0.92
Sit and reach (cm)	5	≥33	≥35	≥36	≥37
	4	30-32	31-34	31-35	32-36
	3	27-29	27-30	28-30	28-31
	2	25-26	24-26	25-27	23-27
	1	≤24	≤23	≤24	≤22
Standing long jump (cm)	5	≥69	≥69	≥112	≥121
	4	41-68	41-68	91-111	98-120
	3	32-40	32-40	73-90	90-97
	2	28-31	28-31	62-72	74-89
	1	≤27	≤27	≤61	≤73
Stork balance (seconds)	5	≥22	≥22	≥78	≥134
	4	9-21	11-21	20-77	27-133
	3	5-8	6-10	11-19	15-26
	2	3-4	3-5	5-10	7-14
	1	≤2	≤2	≤4	≤6

*Stage "5" represent the best performance, while Stage "1" represent acceptable performance.

Gymnastics Award Scheme

A total of 2700 general gymnastic awards had been issued. In addition 4000 leaflets had been distributed to parents to educate them the concept of physical fitness and active life style through gymnastic activities.

Questionnaires were also delivered to 28 kindergartens. Opinions such as: a) the children like to the movements, b) this program could improve children's physical fitness, coordination, body posture, self- confidence, and c) children could also practice some of the exercise at home were received. The representatives from the kindergartens also stated that the difficulties to conduct this program were the followings: more training should be provided for teachers, kindergartens were lack of equipments, spaces, and support form the administrators.

Discussion and Conclusion

Gymnastics is fun and can bring positive development to children. Mc Cuaig (1981), Schembri (1991) and Werner (1994) pointed out the benefits of practicing gymnastics:

a. Gymnastic movements such as throwing, catching, jumping, leaping and rolling contribute to the fundamental motor development of children.

b. Gymnastics can enhance the physical fitness level, such as flexibility and strength.

c. Gymnastics can improve children's abilities in body control and body awareness, such as: balance, coordination , space awareness, effort and relationships.

d. Gymnastics can develop children's self- confidence, self- discipline and mental fitness.

e. Gymnastics can provide opportunities for children to explore, create and solve problem.

f. Gymnastics can enrich team -work and social development.

In order to promote physically active life styles and gymnastics in Hong Kong, children should develop their exercise habits in school. Through this program, gymnastics training courses have been provided to kindergarten teachers to better equip them to teach gymnastics, and teaching materials are provided to teachers. In addition, the general gymnastics award scheme provides self - test for children and enhances successful experiences and positive motivation. Moreover, children can perform gymnastics to their parents, teachers and friends in the fun days.

Furthermore, the parents, teachers and children can better understand their physical fitness level through the physical fitness tests. In future, more training courses should be conducted for teachers to encourage more kindergartens to join this program.

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The Effects of Water Exercise in Korean Elderly Women

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Introduction

Deep Water Exercise consists of aerobic movements in water 3 meters deep with the aid of buoyancy apparatus (either a vest or belt). Doctors recommend this type of exercise for older people who may be experiencing muscle-skeletal weakness or obesity. The movements involve no impact and therefore have less of a detrimental effect on the joints or muscles. Another unique benefit of deep water exercise is balanced development of antagonistic muscle groups. Water resistance reduces the imbalancing effects of gravity and also ensures equal resistance throughout any range of motion. Historically, deep water aerobics were used to increase strength and aerobic ability for athletes, and only recently has it been utilized for the elderly. The purpose of this study is to understand the effects of deep water exercise on the physiques and fitness levels of elderly women.

Methods

Subjects

A total of 21 volunteers from Seodaemun Gu, Seoul were involved in this study. The mean age of the group was 63.6. The mean height of the volunteers was 154.6 cm. The average weight of the subjects at the beginning of the study was 58.6 kg.

Table 1: Age, Height and Weight

Mean Age	Mean Height	Mean Weight (Pre-test)	Mean Weight (Post-test)
63.6	154.6 cm	58.6 kg	57.8 kg

Variables

For the proposal of this study, the variables were as follows:

1. Physiques

The circumference of the neck, chest, waist, hips, and thighs were measured.

Table 2: Circumference of Body

		Variables	Pre-test	Post-test	t-value
Physique	Circumference (cm)	Neck	32.1 (±2.9)	32.2(±2.0)	0.21
		Chest	93.0 (±6.6)	91.5(±6.8)	-5.02**
		Waist	83.7 (±6.7)	82.2(±6.5)	-2.10*
		Hip	94.8 (±6.9)	93.2(±6.8)	-2.31*
		Thighs	50.7 (±11.1)	50.9(±3.9)	0.12

*<.05, **<.01, ***<.001

2. Physical fitness

Flexibility joints: Shoulder, hip, knee, ankle, and toe. Muscles: deltoids, trapezeus, lower back, hip flexor, quadriceps, hamstrings, gastrocnemius, and foot flexors.

Strength: Back muscles and grip strength (right and left) were both measured.

Muscle endurance: Push ups (from a platform of 90cm in height) and the sit ups were both utilized to gauge muscle endurance.

Table 3: Physical Fitness

		Variables	Pre-test	Post-test	t-value
Physical Fitness	Flexibility	Shoulder Flexibility (L)	-8.4 (±7.5)	-4.9 (±5.7)	3.28**
		Shoulder Flexibility (R)	-15.5 (±8.3)	-13.2 (±6.7)	1.90
	Strength	Back muscle Strength	36.7 (±9.1)	42.9 (±9.1)	3.33**
		Grip (R)	17.5(±3.8)	19.5 (±3.1)	3.40**
		Grip (L)	16.1 (±4.7)	18.3 (±3.7)	4.51**
	Muscular Endurance	Push ups	23.6 (±14.7)	30.4 (±12.3)	3.24**
		Sit ups	1.7 (±3.8)	2.2 (±4.5)	1.65

*<.05, **<.01, ***<.001

3. Body fat

Tricep and abdominal muscles were measured using the skinfold method.

Table 4: Body Fat

	Variables	Pre-test	Post-test	t-value
Body	Tricep	23.7 (±4.3)	21.9 (±3.5)	-3.77**
Composition	Abdominal	35.5 (±8.5)	31.5 (±7.4)	-4.86**

*<.05, **<.01, ***<.001

Procedure

There were two components. First subjects immersed themselves chest deep in the water and engaged in a series of stretching exercises. These stretches emphasized the entire body, from the major muscle groups to the fingers and toes.

Next the volunteers were moved to a pool three meters deep. There they began exercising with the aid of a buoyancy apparatus (vest or belt). The exercises mainly consisted of walking and running forward, backwards, and laterally.

During the six-week period, subjects exercised twice a week for one hour per session. The average water temperature was 28 degrees celsius.

Statistics

Paired t-test was used during a six-week experimental period. Records of physiques, physical fitness, and body fat were compared over the experimental period. Flexibility results were sorted into Dichotomous Data Pools (Pass or fail). Friedmen's ANOVA by ranks was also utilized to make deductions from the flexibility data.

Results and Discussion

Table shows the final results of the t-Test after six weeks of deep water exercise. The final results show the changes in the subjects weight, physique, physical fitness, and body composition.

Physique

Statistically significant weight changes ($t = -3.48$, $p < .001$). Water walking burns 525Kcal / 1 hour, more than twice the amount expended through normal walking (240Kcal / 1 hour). This difference accounted for the weight loss experienced the test subjects.

Circumferences of the subjects chest, waist, and hips changed in a statistically significant manner. These results reflected the same results garnered from a previous test conducted by the author (Yi, 2000).

Physical Fitness

Flexibility in the right shoulder ($t = 3.28$, $p < .05$) and right hip ($x = 4.0$, $p < .05$) showed statistically significant changes. However, the results for the left side were not consistent with those of the right side. This illustrates the independent and separate development of flexibility either side of the body.

Statistically significant changes in muscle strength were measured in both the subjects' back strength ($t = 3.33$, $p <. 01$) as well as their grip strength ($t = 3.40$, $p <. 01$). These results mirrored similar changes recorded by both Yi (1999), and Hoeget (1992). All of these tests concluded the effectiveness of exercise was increased with the addition of water resistance.

The number of push ups the subjects were capable of changed in a statistically significant manner ($t = 3.24$, $p <. 01$). The sit up test, however, yielded results that were inapplicable to this study. For the aged, the sit up test provides a more accurate gauge of power output, rather than muscle endurance. Furthermore, the test subjects, like other elderly people, were plagued with chronic pain and physical problems which made it impossible for many of them to perform this exercise.

Body Composition

Fat content of the tricep area and abdominal area changed significantly statistically. These results were consistent with conclusions drawn by Yi (1999), Abrahamet et al. (1994), Hoeget et al. (1992), and Quinn (1994).

Conclusion and Suggestions

The results of this study demonstrated the positive effects of deep water exercise for the aged. Physique, physical fitness and body composition underwent statistically significant changes. By the end of the study participants were able to reduce the circumference of their chest, waist, and hips. Test subjects increased their functional strength (both grip strength and lower back strength). Finally the volunteers reduced their fat composition. Overall, these changes reflect improved health for the elderly. The non-impact nature of the exercises, combined with the gentle resistance of the water made the negative effects of this program negligible. Furthermore, after six weeks many of the participants commented on the reduction of chronic pain, improved posture, and an increased ability to perform daily tasks. A follow-up study will investigate the effects of deep water exercise on chronic pain, posture, and quality of living for the elderly.

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International Federation of Adapted Physical Activity (IFAPA)

http://www.ifapa.net

IFAPA is a crossdisciplinary professional organization of individuals, institutions, and agencies supporting and promoting adapted physical activity, disability sport, and all aspects of sport, movement, and exercise science for individuals with special needs. Members include scholars, researchers, pedagogists, scientists, and practitioners in general and adapted physical education, community and therapeutic recreation, dance and creative arts, medicine, nutrition, sport training and competition, rehabilitation, special education, occupational and physical therapy, gerontology, and many other areas.

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IFAPA coordinates national, regional, and international functions (both governmental and nongovernmental) that pertain to sport, dance, aquatics, exercise, fitness, and wellness for individuals of all ages with disabilities or special needs. IFAPA is officially linked with several other international governing bodies, including the International Paralympic Committee (IPC) and the International Council of Sport Science and Physical Education (ICSSPE).

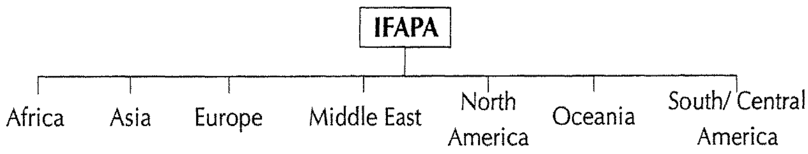

Figure 1: IFAPA Regions

IFAPA was founded in 1973 in Quebec, Canada. Previous International Symposia are shown in Table 1.

Table1: Previous International Symposia

Previous International Symposia	
1977 in Quebec, Canada	1991 in Miami, U.S.A.
1979 in Brussels, Belgium	1993 in Yokohama, Japan
1981 in New Orleans, U.S.A.	1995 in Oslo and Beitostolen, Norway
1983 in London, Great Britain	1997 in Quebec, Canada
1985 in Toronto, Canada	1999 in Barcelona/ Lleida, Spain
1987 in Brisbane, Australia	2001 in Vienna, Austria
1989 in Berlin, Germany	2003 in Seoul, Korea

* IFAPA has the official Journal "Adapted Physical Activity Quarterly" published by Human Kinetics.

Asian Society for Adapted Physical Education and Exercise (ASAPE)

http://home.hiroshima-u.ac.jp/asape/indexj.html

ASAPE was founded in Seoul, Korea in 1986. More than 250 professionals, practitioners, and physical education teachers from 11 countries are registered as ASAPE members. The objective is to contribute to the development of research and study on adapted physical education and exercise for individuals with special needs and the elderly.

Previous International Symposia of ASAPE have been held:

1989 in Nagoya, Japan	**Chairperson:** Dr. Yabe, K., Nagoya University
1991 in Miyazaki, Japan	**Chairperson:** Prof. Kusano, K., Miyazaki University
1994 in Taipei, Taiwan R.O.C.	**Chairperson:** Dr. Lin, M. H., Chinese Culture University
1996 in Seoul, Korea	**Chairperson:** Dr. Hong, Y. J., Ewha Womans University
1998 in Tsukuba, Japan	**Chairperson:** Dr. Nakata, H., University of Tsukuba
2000 in Taipei, Taiwan R.O.C.	**Chairperson:** Dr. Lin, M. H., National Taiwan Normal University
2002 in Hong Kong, China	**Chairperson:** Dr. Sit, C., The University of Hong Kong
2004 in Jakarta, Indonesia	To be held

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