Adaptive Clothing Designs for the Individuals with Special Needs

Hyun-Shin Na†
Dept. of Clothing Science, Seoul Women's University

지체 장애인을 위한 개호복 디자인

나 현 싸†
서울여자대학교 의류학과
(2007. 4. 13. 접수)

Abstract

Nowadays the numbers of the disabled and elderly have been increasing, and the development of adaptive clothing for these people is in demand. The purpose of this study was to give ideas and solutions for the special needs clothing design. The knowledge of medical situation of the individuals with special needs has been examined and factors affecting adaptive clothing were suggested. Twenty-one web sites were investigated and the most practical, functional, fashionable adaptive clothes were suggested by items. Construction and location of openings, number and type of fastenings, and design of garments for comfort and ease of movement were carefully considered in these clothes. Better appearance through improvement of clothing will help these people to believe that they have worth in the sight of others and in their own view of themselves. Disabled and elderly can obtain the quality of life, maintain the dignity, and make the access to the world a little bit easier by solving the particular clothing problems with all these convenient as well fashionable adaptive clothing.

Key words: Adaptive clothing, The disabled, The elderly; 개호복, 장애인, 노인

I. Introduction

Clothing is one of the essential needs of all people and is a subject of universal interest. Expressing themselves with clothing is the right that everybody has. Most people have very little difficulty in purchasing attractive, fashionable clothing in standard sizes that satisfy their personal and social needs, but for those who are physically handicapped, or elderly, the problem of satisfying their clothing needs may be very difficult or impossible (Hoffman, 1979).

Nowadays, the numbers of the disabled and elderly have been increased because of the growing accidents or disease and the lengthening span of life. As long as individuals with special needs take their places in society and work among other people, they must have clothing that is functional and attractive to meet their special needs.

Beginning in the late nineteenth century, psychologists, sociologists, and anthropologists engaged in study of the social significance of clothing. As the members of the medical profession and the social scientists became more interested in the needs of these minority groups in the 1940s when large numbers of disabled veterans were returning to the United States. Occupational therapists, physical ther-

†Corresponding author
E-mail: hsna@swu.ac.kr
This work was supported by a research grant from Seoul Women’s University (2007).
apists, apparel designers, and home economists have applied their knowledge of design, construction, and the social significance of clothing needs of people, particularly the physically handicapped and the aged under the terms of human values, human needs, human relationships, and human rights (Hoffman, 1979).

The purpose of this research was to develop the special needs clothing design combining fashion and function. This can offer an advice not only to the individuals with special needs but also to the designers interested in creating special needs clothing. I attempted 1) to analyze what kind of difficulties lie which confront the physically disabled who are incapable of executing normal dressing movements, 2) to suggest factors affecting adaptive clothing, 3) to investigate the adaptive clothing in nowadays specialty clothing market through the web sites, 4) to suggest ideas developing adaptive clothing in the future. For this purpose, a literature review was applied and research for the products in the adaptive clothing market was done.

Once better-planned, more fashionable and convenient clothes were produced, people with special needs could be more independent and save time, effort and energy for other activities. They can also lift their self-confidence and self-esteem with the garments which is convenient as well as fashionable.

II. Disability and Clothing Problems

Clothing problems arise from a medical situation, and knowledge of this helps to approach clothing designs for the disabled. In this chapter, I looked over the classification of disability based on 'the law on the welfare of the disabled', and analyzed what kind of difficulties lie which confront the physically disabled who are incapable of executing normal dressing movements.

1. Classification of Disability

The Disability Discrimination Act (DDA, 1975) by UN defines a disabled person as someone who has a physical or mental impairment that has a substantial and long-term adverse effect on his or her ability to carry out normal day-to-day activities.

The following distinction is made by the World Health Organization (WHO, 1980), in the context of health experience, between impairment, disability and handicap: “Impairment: Any loss or abnormality of psychological, physiological, or anatomical structure or function. “Disability: Any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being. “Handicap: A disadvantage for a given individual, resulting from an impairment or disability, limits or prevents the fulfillment of a role that is normal, depending on age, sex, social and cultural factors, for that individual.”

Handicap is therefore a function of the relationship between disabled persons and their environment. It occurs when they encounter cultural, physical or social barriers which prevent their access to the various systems of society that are available to others. Thus, handicap is the loss or limitation of opportunities to take part in the life of the community on an equal level with others (http://www.un.org/esa/socdev/enable/rights/ahcsta3refdispecific.htm).

Following is the classification of disability based on 'the law on the welfare of the disabled' by the Ministry of Health and Welfare of Korea (Fig. 1). The adaptive clothing is mainly related with people who have body & limbs or brain injury since rest of other physical injuries do not affect the movement much which create clothing problems.

![Classification of disability based on 'the law on the welfare of the disabled']
Table 1. Disability and the problems in clothing

<table>
<thead>
<tr>
<th>Disability</th>
<th>Characteristics</th>
<th>Problems in Clothing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amputees</td>
<td>Lower limb amputations from the accident or illness</td>
<td>Disfigurement is always visible, and this can have varying psychological effects on the individual</td>
</tr>
</tbody>
</table>
| Arthritis       | Chronic inflammatory disease of the joints which limits movement                 | Have difficulty in getting dressed & undressed  
Need to be kept warm  
Shape problems can arise |
| Spinal Injuries | The damage in the spinal cord                                                   | Unable to dress by themselves  
Need to be kept warm  
Non-absorbent, synthetic fibers must be avoided  
Seams must be carefully positioned to avoid pressure sores |
| Spina Bifida    | In wheelchairs or using support  
Wear pads or bags because of incontinence                                         | Fastenings may cause a problem for some people  
Need to be kept warm  
Safety is a primary requirement for clothing  
Difficulties in shape and proportion  
Easy access needed for incontinence pads and appliances |
| Scoliosis & Kyphosis | Scoliosis is sideways curvature of the spine  
Kyphosis is a hump back              | Need to be kept warm  
Fit garment to a brace rather than to a person  
Detract the eye away from the appliance because the main clothing problem is to get garments to hang correctly  
Wear and tear problems |
| Dwarfing Disease| Abnormally reduced size from a disorder of the pituitary gland and a lack of growth hormone | Figure can be small but in proportion or have short arms and legs in relation to body size  
Have difficulty in finding clothing to suit their age  
Need to have their garments made to measure |
| Cerebral Palsy  | Paralysis from partial damage of brain which controls the muscles               | Unable to dress by themselves  
Shape problems can arise from the rigid limbs of the spastic and the floppy posture of the athetoid |
| Strokes         | Partial, one-sided, or complete paralysis from the interruption of the blood supply to the brain | Dressing is a slow and frustrating process  
Fastenings cause difficulty  
Fabric should be easy to care for to assist independence |

2. Clothing Problems

Disabilities affect people in so many ways and to such different degrees. Knowledge about the cause of disability, physical characteristics, and problems in a daily life can help us to approach clothing designs for the disabled. It can also provide some ideas for the garments which meet all the needs of these individuals. Table 1 shows the characteristics of disability and problems relating to clothing (Thornton, 1990).

The range of problems to consider when designing and making clothes for the disabled is quite considerable. It has to cover shape, size and proportion, amputation, restricted movement, loss of manipulative skills, excessive cold and heat, wear and tear of garments by appliances or by means of transportation, incontinence, safety, and accessibility to appliances (Thornton, 1990). Having looked at various disabilities and the many clothing problems, we must now find solutions to these problems.

III. Adaptive Clothing

1. Factors affecting Adaptive Clothing

There are several essentials that adaptive clothing has to have. Schematic representation of the factors affecting adaptive clothing is as follows (Fig. 2). Sociopsychological, aesthetic, management, economics,
physical aspects should be considered in the adaptive clothing for individuals with special needs.

1) Socio- psychological Aspect

In socio-psychological aspect, looking good, feeling good, and having the right clothes that promote the independence in dressing can increase self confidence and self-esteem in look. In other words, adaptive clothing can provide an immense socio-psycho-logical boost among the individuals with special needs.

2) Aesthetic Aspect

People with special needs face the inconvenience of shopping for clothes. The majority of those consumers experienced major problems in finding fashionable clothes that fit their disabilities. In aesthetic aspect, all clothes should be attractive and fashionable showing off the wearer’s good points and conceal the disablament. For a fashionable look, changes in the adaptive clothing should be invisible when the garment is worn(Kennedy, 1981).

3) Management Aspect

Disabled people need to consider the extra wear and tear on clothing because they get far more wear and tear and washing than do garments made for the able-bodied. Wheelchair arms, or the joints of appliances can cause heavy wear at particular points. It is wise to make sure that garments are made of strong enough material at particular points. A major difficulty can be that tough fabrics produce bulky seams which may damage sensitive skins or cause pressure sores. In this case, clever design of the garment with careful positioning of the seams is needed to reduce the problem(Thorton, 1990).

4) Economic Aspect

In economical aspect, products at affordable prices are in great concern of adaptive clothing since most of people with special needs have lower incomes and higher cost. Give consideration to the purchase price of a garment and the cost per wearing. And it is wise to select items which can be matched to several units to extend the wear life of a garment and reduce the cost of each wearing(Kennedy, 1981).

5) Physical Aspect

For the individuals with special needs comfort and easy access must be considered. Clothing must be convenient to put on and take off, with good long openings and the minimum of fastenings. It makes the task of getting dressed easier and less painful and frustrating by utilizing unique features, such as velcro closures or snaps.

Protection is needed for those who have little or no control of mouth muscles and tend to dribble, otherwise their upper clothing will be constantly wet, which often leads to chest infections. Delicate skin needs protection from rubbing or pressure caused by rough seams or bulky fastenings.

By considering physical aspects, adaptive clothing can promote independence of the people with special needs in dressing and also provide ease in the dressing process for the caregiver.

2. Adaptive Clothing in Current Apparel Market

There are numbers of web sites that are sources for special needs or adaptive clothing. The following web sites were on the list under the key word ‘adaptive clothing’(Table 2). After investigation of clothing and products available in 21 web sites, the most practical, functional, fashionable adaptive clothing were suggested by items.
Table 2. Web sites of adaptive clothing

| www.ableapparel.com | www.mjdesignsin.com |
| www.adaptivclothingshowroom.com | www.personalcarewear.com |
| www.buckandbuck.com | www.professionalfit.com |
| www.careapparel.com | www.shop-thenet.com |
| www.easyaccessclothing.com | www.simplantex.co.uk |
| www.myeasydoesit.com | www.silverts.com |
| www.epiphanydesign.ca | www.speciallyforyou.net |
| www.gramssunshines.com | www.spec-1.com |
| http://innovativeplums.com | www.wheelchairjeans.com |
| www.liftvest.com | www.wardrobewagon.com |
| www.minimiracles.ca | |

1) Foundation garment

Table 3. Design & features of foundation garment

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
</table>
| ![Front Closing Bra](image) | • Front Closing Bra([www.silverts.com](http://www.silverts.com))  
Front velcro fasteners  
Large finger loops for easy grasping to facilitate dressing  
Help people with dexterity limitations |
| ![Open Back Slip](image) | • Open Back Slip([www.silverts.com](http://www.silverts.com))  
Full back overlap with snaps at each shoulder  
Cut-away at back  
Can be slipped on in a seated position  
Offer easy access for sanitary considerations.  
Help people who are disabled or wheelchair dependent |

2) Shirt, blouse & Vest

Table 4. Design & features of shirt & blouse

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
</table>
| ![Velcro Front Shirts](image) | • Velcro Front Shirts([www.professionalfit.com](http://www.professionalfit.com))  
Velcro tabs behind the placket  
Decorative buttons in the front  
Help people who have difficulty in buttoning |
| ![Open Back Blouse](image) | • Open Back Blouse([www.silverts.com](http://www.silverts.com))  
Full back overlap with double snaps at shoulders and neck  
Decorative buttons in the front  
Allow the individuals arms to be slid into the sleeves without raising/lowering arms or struggling with small neck openings  
Help people who suffer from arthritis or wheelchair dependent |
| ![Snap Back Shirt](image) | • Snap Back Shirt([www.buckandbuck.com](http://www.buckandbuck.com))  
Snaps on the back  
Help people who have limited range of motion |
Table 4. Continued

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Clothing Protector T-shirt(<a href="http://www.professionalfit.com">www.professionalfit.com</a>)</td>
<td>Terry cloth lining</td>
</tr>
<tr>
<td></td>
<td>Snaps on the back</td>
</tr>
<tr>
<td>• Clothing Protector Shirt(<a href="http://www.professionalfit.com">www.professionalfit.com</a>)</td>
<td>Waterproof lining</td>
</tr>
<tr>
<td></td>
<td>Decorative buttons in the front</td>
</tr>
<tr>
<td></td>
<td>Velcro fastening on the back</td>
</tr>
<tr>
<td>• Cut Out Back Shirt(<a href="http://www.professionalfit.com">www.professionalfit.com</a>)</td>
<td>Cut out the back of shirt completely to aid in dressing</td>
</tr>
<tr>
<td></td>
<td>Help people who are disabled or wheelchair dependent</td>
</tr>
<tr>
<td>• Clothing Protector Vest(<a href="http://www.professionalfit.com">www.professionalfit.com</a>)</td>
<td>Waterproof lining</td>
</tr>
<tr>
<td></td>
<td>Velcro fastening on the back</td>
</tr>
<tr>
<td></td>
<td>Dressier alternative to the standard bib</td>
</tr>
</tbody>
</table>

3) Pants & Skirt

Table 5. Design & features of pants & skirt

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hi-Waist Pants(<a href="http://www.professionalfit.com">www.professionalfit.com</a>)</td>
<td>Full elastic waist</td>
</tr>
<tr>
<td></td>
<td>Cut higher in the back</td>
</tr>
<tr>
<td></td>
<td>Flat seams and a roomier seat</td>
</tr>
<tr>
<td></td>
<td>Help people in a wheelchair</td>
</tr>
<tr>
<td>• Out-seam Opening Pants(<a href="http://www.professionalfit.com">www.professionalfit.com</a>)</td>
<td>Snap from the waist to the ankle</td>
</tr>
<tr>
<td></td>
<td>Help people with broomstick plaster</td>
</tr>
<tr>
<td>• Velcro Opening Pants(<a href="http://www.buckandduck.com">www.buckandduck.com</a>)</td>
<td>Velcro opening fly</td>
</tr>
<tr>
<td></td>
<td>Help people who have difficulties operating zipper</td>
</tr>
<tr>
<td>• Open Back Pants(<a href="http://www.silverts.com">www.silverts.com</a>)</td>
<td>Full elastic waist</td>
</tr>
<tr>
<td></td>
<td>Two overlapping back panels that close in the middle</td>
</tr>
<tr>
<td></td>
<td>Snap closures at the back waist for easy seated dressing</td>
</tr>
<tr>
<td></td>
<td>Help people who is immobile or incontinent</td>
</tr>
</tbody>
</table>
### Table 5. Continued

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
</table>
| ![Open Back Pants](www.silverts.com) | - Open Back Pants(www.silverts.com)  
  One large overlap flap at back  
  Snap closures at the back waist for easy seated dressing  
  Help people who is immobile or incontinent |
| ![Side Opening Pants](www.silverts.com) | - Side Opening Pants(www.silverts.com)  
  Both sides opening with easy adjustable velcro fastening  
  The front fold-down panel provides slip-on ease for seated position  
  Help people with arthritis or wheelchair dependent |
| ![Wrap Skirt](www.silverts.com) | - Wrap Skirt(www.silverts.com)  
  Waist band with easily adjustable Velcro fastening  
  Great for seated dressing  
  Help people with arthritis or wheelchair dependent |

#### 4) Dress

### Table 6. Design & features of dress

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
</table>
| ![Full Open Back Dress](www.silverts.com) | - Full Open Back Dress(www.silverts.com)  
  Back overlap for easy seated dressing  
  Snap closures  
  Help people who is immobile or wheelchair dependent |
| ![Half Open Back Dress](www.silverts.com) | - Half Open Back Dress(www.silverts.com)  
  Overlap from the back yoke seam  
  Help people who is immobile or wheelchair dependent |

#### 5) Outerwear

### Table 7. Design & features of outerwear

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
</table>
| ![Wheelchair Cape](www.silverts.com) | - Wheelchair Cape(www.silverts.com)  
  Zipper in the front/ Shorter back  
  Provide warmth and comfort  
  Attached hood to keep out the rain  
  Help wheelchair dependent |

#### 6) Accessories

### Table 8. Design & features of accessories

<table>
<thead>
<tr>
<th>Design</th>
<th>Features</th>
</tr>
</thead>
</table>
| ![Zip-up Tie](www.professionalfit.com) | - Zip-up Tie(www.professionalfit.com)  
  Easy to put on & off  
  Can be adjusted to fit any neck size perfectly  
  Help people who have difficulties wearing Ties |
| ![Clothing Protector Bandana](www.professionalfit.com) | - Clothing Protector Bandana(www.professionalfit.com)  
  Terry cloth lining  
  Snaps on the back  
  Help people who suffer from dribbling |
IV. Conclusions

Changes and limitations that occur in physical body are more pronounced for the people with special needs, and they have great difficulty finding garments that fit correctly, hang properly, and being dressed easily. The feeling of self-confidence, the sense of well-being and of social acceptance that comes from the wearing of clothing that is functional, appropriate, and attractive, is important to all people, but to those with special needs, it is much more important.

Adaptive clothing is needed for the disabled with body & limbs or brain injury and elderly who are incapable of executing normal dressing movements. Nowadays, the numbers of the disabled and elderly have been increased because of the growing accidents or disease and the lengthening span of life.

The purpose of this study was to offer ideas and solutions for the special needs clothing design combining fashion and function. To provide the right clothing for the people with special needs, the examination of their medical situation has been preceded since the clothing problems arise from a medical situation, and the knowledge of these can help to approach to the clothing designs for the disabled.

Socio-psychological, aesthetic, management, economics, physical aspects must be considered in adaptive clothing; In socio-psychological aspect, adaptive clothing can provide immense socio-psychological boost among the individuals with special needs. In aesthetic aspect, it should be attractive and fashionable showing off the wearer's good points and conceal the disablement. In management aspect, wear and tear problem should be solved with careful positioning of the seams reducing pressure sores out of tough fabric. In economical aspect, it should be within the reasonable price range so that individuals with special needs can afford. In physical aspect, comfort and easy access must be considered to get dressed easier and less painful and frustrating.

21 web sites were investigated and the most practical, functional, fashionable adaptive clothing were suggested by items. Among foundation garments, front closing bra with velcro fastening and large fin-ger loops was introduced since most of people with special needs have problems reaching to the back to fasten a bra and manipulating small hooks and eyes independently. Open back slip with full back overlap and cut-away back could offer easy access for sanitary considerations of wheelchair dependent. In shirt, blouse, and vest, velcro or snaps were replaced by buttons to solve the manipulating problems. Open back blouse and cut out back shirt which fasten down the back allowed the individuals to dress without raising/lowering arms or struggling with small neck openings. T-shirt or vest type clothing protector with lining could be also useful as an alternative to the standard bib. In pants and skirt, hi-waist pants with higher back, flat seams, and a roomier seat could help wheelchair dependent. Out-seam opening pants with snaps from the waist to the ankle were designed to accommodate a broomstick plaster. Pants with velcro opening fly could help people who have difficulties in operating zipper. Open back pants with one large overlap flap or two overlapping back panels could allow easy seated dressing and help people who are immobile or incontinent. Side opening pants with the front fold-down panel could provide slip-on ease from a seated position and help people with arthritis or wheelchair dependent. Wrap skirt with easily adjustable velcro fastening could be great for seated dressing and help people with arthritis or wheelchair dependent. In dress, full open back or half open back from the back yoke seam could help dressing of people who is immobile or wheelchair dependent. In outwear, wheelchair cape with hood, front zipper, and shorter back could provide warmth and comfort to the wheelchair dependent. In accessories, zip-up ties could help people who have difficulties wearing ties and clothing protector bandana with lining could be used instead of bibs.

The numbers of the disabled and elderly have been increasing nowadays, and the development of adaptive clothing is desperately in demand. Better appearance through improvement of clothing will help these people to believe that they have worth in the sight of others and in their own view of themselves. Disabled and elderly can obtain the quality of life, maintain the dignity, and make the access to the
world a little bit easier by solving the particular clothing problems with all these convenient as well fashionable adaptive clothing. In other words, well designed and constructed adaptive clothing for individuals with special needs should be kept studying and developing as an ongoing project with careful attention to differing shapes, manipulative skills, and degrees of mobility.

References


