

Clothing for the Handicapped(Part II)
- Wheelchair & Crutch Users -
장애인을 위한 의복디자인(제2보)
-휠체어 및 목발 사용자를 중심으로-

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Abstract

연구의 목적은 지체장애인들의 신체적 특성을 고려하여 움직이기 편하면서 외관이 보기좋은 기능성 의복을 제작하는데 있다.

휠체어, 크러치를 사용하는 여성 장애인을 대상으로 자켓, 바지, 휠체어 랩을 제작하여 외관상 기성복과 차이가 나지 않으면서 보조기구를 사용하는데 불편함이 없는 디자인을 제시하였다.

연구의 결과는 다음과 같다.

첫째, 휠체어사용자 자켓은 어깨와 팔의 동작을 쉽게 하기 위해서 뒤 bodice 소매둘레부위에 action pleats를 주었으며 팔꿈치 부위에 주름으로 처리하여 당김과 움직임을 수월하게 하였다. 바지는 허리선 위치를 수정하고 굽혀져있는 무릎부위에 앞은 주름, 뒤는 다이어트로 처리하였다.

둘째, 크러치 사용자는 전체적으로 외관이 올라간 것처럼 보이는 것을 막기 위하여 자켓길이를 길게 하고 자켓 위에 조끼를 덧입는 것처럼 보이게 하였다. 바지의 허리선은 고무벨트를 달았으며 양쪽 옆트임을 하여 지퍼를 달았다.

셋째, 휠체어 랩은 방수와 방한을 대비하여 만든 옷으로 전체적인 외관이 롱 원피스 형이며 발부위에 사각형 발판을 만들어 바람이 들어오지 못하도록 하였고, 양쪽 옆 지퍼를 사용하여 여밈 처리하였다.

Key words: The handicapped, Wheelchair, Crutch, Functional Garment;
장애인, 휠체어, 크러치, 기능성 의복

I. Introduction

1. Purpose

More than 100,000 persons become disabled due to traffic accidents and industrial disasters every year, and there are about 15 million handicapped people in Korea¹⁾ and the number is on the

increase every year. To protect the basic rights of the handicapped, various legal systems and basic social facilities are being newly established and supplemented, and the awareness of the public in general is changing. But there are still many things to be improved to ensure their free activities.

The handicapped have their preferences for the garments which not only are fit to their body,

convenient for moving freely and do not expose their disabled part but also satisfy their aesthetic and psychological desires and make them look good when wearing them².

Such garments have not been studied for a long time. The interest in the garments of the disabled which began in the 1930s made basic-functional and fashionable garments begin to appear in the mid 1950s. The handicapped preferred the aesthetic aspect of their clothes which fit them well and made them attractive but also were not out of fashion rather than convenient clothes which make their disabled part noticeable as time passed. But looking at the domestic situation, there are almost no places which can satisfy the quest of the handicapped for garments. Therefore, most of the handicapped buy ready-made clothes or wear used clothes which have been amended even if they are inconvenient to wear.

The constitution of their body is very different from common people. It has been shown that general students of elementary, middle and high schools have better constitution in height, weight and sitting height than the disabled except for the bust of girls³. Also because disabled persons have varying disabled parts and use aiding equipments, ready-made clothes are inconvenient for them to move.

The purpose of this study is to present the physical characteristics of the handicapped. And it is to design and manufacture functional garments for the handicapped which make clothes easier to wear and move around in.

We manufactured a jacket, pants and a wheelchair wrap which are basic items for the handicapped women using a wheelchair or a crutch. These clothes don't look different from ready-made ones in appearance, but focused on detailed parts to solve the inconvenience problem

when using aiding equipments. These garments were designed based on the suggestions proposed by many researchers, and supplemented through several times of wearing on experimentees.

II. Theoretical Background

1. Interest of the Handicapped in Garments

The interest of the handicapped in garments is higher than common people. They dislike the clothes distinguishing them from their peers who are not disabled, but like to wear clothes which not only make them attractive but also hide their equipment⁴. According to a study by Seon-Sik Sim⁵, 38% of males and 37% of females among physically-disabled young people are unhappy with their clothes and this is shown through requests and complaints, and 30% of disabled young males were not interested in their clothes, and wore the clothes their mothers chose.

Also the handicapped use their clothes as a means to raise their confidence. They are positive in expressing themselves by continually taking care of their outward appearance and want to show their most positive aspect. They especially want to receive positive response from others through their clothes. It can be said that this enables favorable role performance with common people who are not disabled⁶ and the general rehabilitation course which makes them continue their social life with confidence⁷.

However, if garments for the disabled have a different appearance from those of common people who are not disabled, disabled people may feel the effect of stigmatizing⁸ and psychological shrinkage. Therefore, the ready-made clothes, which can be revised to suit various wearers, should be developed and so a positive attitude toward developing such garments is required⁹.

2. Attitude toward the Handicapped with Ready-Made Clothes

There are various kinds of equipments for the handicapped such as a wheelchair, a crutch, a brace, and so on. Because wheelchair users live mostly sitting, their clothes have more inconvenient parts than those of common people. Wheelchair users need sufficient room in their garments at their shoulders and breast because they have to drive the wheelchair whenever they move, their clothes should have a yoke in the back and pleats or gathers. When they are sitting on the wheelchair, the back of their pants is pulled down and the front has extra length. So the center of the back should be raised up and the front of the pants should be shortened¹⁰. In order to make their arms easier to move, a side-opening at the sleeve seams which opens is appropriate, and care should be given to lower parts of sleeves because they can be bound on the wheels if too large¹¹. And because the brim of sleeves can be easily worn out, detachable sleeves of thick cloth should be attached¹².

For female wheelchair users, the overwrap skirt which is conveniently detachable as they are sitting and covering their lap when sitting on the wheelchair is appropriate.

The biggest problem with crutch users is that the armpits of their clothes are easily worn out. Because these parts get much friction, an overhem or reinforcing strip should be attached, and raglans or kimono sleeves are appropriate to enable the arms to move easily. When using a crutch, garments are pulled up in general, and so an over-blouse is appropriate¹³. Because they experience inconvenience with buttons and many problems with the clothes at their shoulders, bodice back, lap, ankles, and when they walk, they want clothes which can be easily detached¹⁴.

Brace users have problems of the knee part on pants becoming easily worn out due to much friction with brace. So the knee part on pants should have sufficient room and should be spacious to cover the splints¹⁵. Especially, the seams on the inside of the pants should be treated to prevent the edges of the brace from hanging, endurable against washing and also be made of the cloth which can prevent pollution and static electricity¹⁶. In the case of revising the clothes for common children to the special clothes for the handicapped children, the most revised part was the replacement of adjusting components of jackets. Hence, the components which can be easily adjusted should be used¹⁷.

The handicapped are mostly helped with putting on and taking off their clothes¹⁸.

Therefore, the clothes they prefer are those which are convenient to put on and take off and comfortable as well. As for the top, they like t-shirts, a jumper, training shirts and a sweater. As for pants, they like to wear pants, such as disco pants, jersey pants and jean pants. Also they prefer the garments which have a round neckline, a shirt collar, a front opening or a whole front opening top, and no opening tops such as a tunic and raglan sleeves. And a rubber waist band using large buttons, hooks or zippers on pants are preferred than the small ones or snaps.

Adjustable fasteners that especially all the handicapped handle well are velcro. Small snaps rather than large ones are less inconvenient for them to adjust. They prefer metal zippers to plastic ones¹⁹.

3. Attitude toward Clothing for the Handicapped

Most of the handicapped buy ready-made clothes or amend them by themselves. But they

are not specific to their individual situations, they only emphasize the convenient function.

Why are special garments important to the handicapped?

First, the functional clothes which are designed by considering physical inconveniences enable them to put on and take off the clothes for themselves without assistance of other people. Second, the functional garments which are designed to make them be recognized socially can reduce the abnormal feeling of the handicapped and enable them to establish positive social relationship with others. But care should be given because the outward appearance can look too much different from common clothes if the functional aspect is emphasized too much²⁰.

The handicapped do not like the garments which are too different from the clothes for those not disabled. When showed pictures of 10 styles of functional clothes, disabled male and female university students, they liked the clothes which looked good and revolutionary in their design itself like one-piece dresses made with a yoke inside or designed for those not disabled to wear. And in case the clothes themselves have strong functional characteristics such as rain coats like a poncho, they are not greatly conscious of the additional features for them.

Hence, the handicapped dislike being paid much attention from general people because of their clothes which make their disabled parts stand out or draw attention unlike the clothes for those not disabled. They fear that they might look alienated from the social norm²¹.

III. Method

We designed and constructed a jacket, pants and a wheelchair wrap for the wheelchair users,

and a jacket and a pants for the crutch users, based on the solutions proposed by many researchers.

We measured the body size of two women using the wheelchair and crutch, and designed the garments to be suitable for their body characteristics and focused on the detailed supplement for each part to remove inconveniences which occur when using the wheelchair and crutch.

The wheelchair user suffers from cerebral palsy and infantile paralysis at the same time. Being seen from the front, her left shoulder is asymmetrically raised, and her upper body is unusually weak in comparison with healthy people of the same age. Because she has handicapped hands and arms, she cannot help using a wheelchair when she wants to move.

The crutch user suffers from infantile paralysis. She is married and has delivered a baby. She moves back and forth by pushing her hips on the floor at home, and uses the crutches when she has to go out. She is short, and has a slightly raised-left shoulder. She suffers from the paralysis only in her legs.

Table 1. Body size of experimentees(cm)

		Wheelchair User	Crutch User
Jacket	Height	150	150
	Jacket length	56	70
	Bust	78.6	87
	Waist	66	71
	Back width	42	
	Back length	42	40
	Shoulder length	39	34
	Sleeve length	51	50
Pants	Hip	82	87.5
	Knee length	55	
	Hip length	21	22
	Crotch depth	53	

<note> The knee length of the wheelchair user needs to be measured to allow comfortable movement in the knee area and to allow wrinkles in the knee area of the pants. Since wheelchair users are always sitting, the circumference of the hips is bigger than normal people, so crotch depth and front-back length were measured as well.

IV. Development of Designs

1. Jacket and Pants for the Wheelchair Users

The wheelchair users live mostly sitting and need functional garments which are convenient to use their equipment and good-looking as well. The length of a jacket is decided depending on their sitting height and degree of shoulder-bending. Most of the handicapped shrink in the front and lengthen in the back as their shoulders bend forward. Accordingly, the neck of the jacket should be of an appropriate length. The length of the experimentee's back is 42cm, so the back center of

the jacket needed to be 56cm long. Proper room is needed at the shoulders and upper body part to roll the wheels of the wheelchair.

We gave action pleats to the arm hole in a way to give leeway. Since these pleats are folded inside, they are not visible when not moving and the leeway of pleats makes the movement of their arms easier.

For smooth action as they use their arms much, the elbow parts of the clothes have pleats to reduce pulling. The lower part of the sleeves is detachable from the upper part of the elbow by using magnetic fasteners. Because the position of adjustable buttons in ready-made clothes changes when one is sitting, belt type velcro which doesn't change much in position is used. Velcro is the adjustable fastener for the handicapped rather than the button, because it makes it easier for them to put on and take off clothes. The biggest problem with the pants is that the position of their waist line changes. When sitting, the position is a slant line when viewed from the side with the front going up

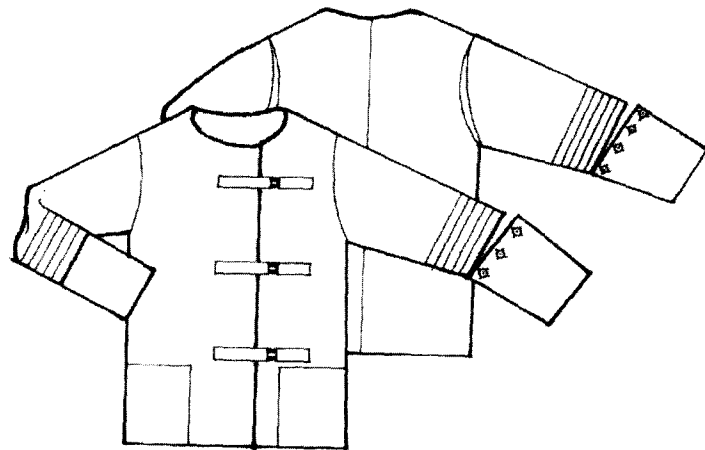
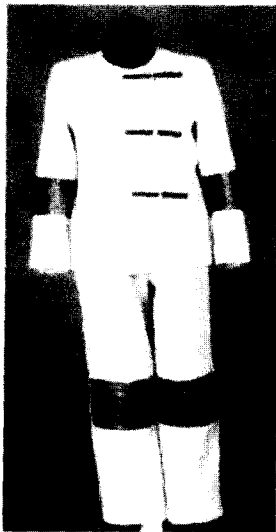


Fig. 1. Jacket for the wheelchair users

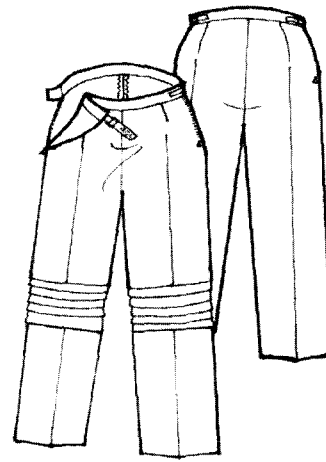
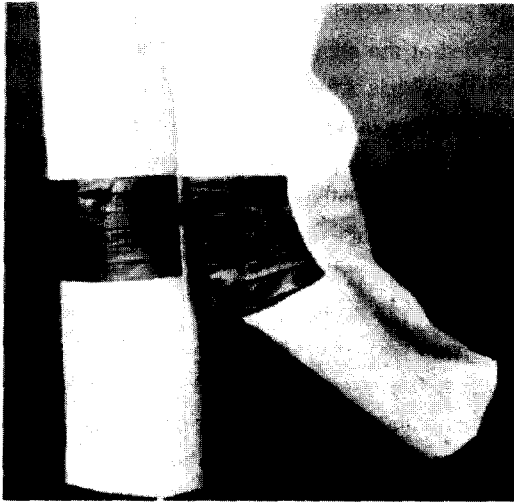


Fig. 2. Pants for the wheelchair users

and the back going down. So the position revision is important. Therefore, the front waist line goes down 3~5cm at the front center and the back one goes up 5~8cm at the back center to give a comfortable sitting.

As the back of the knee is bending, a horizontal dart is made to remove the wrinkling of the back of the their knees. The front of knees has pleats to reduce the length change of the trousers when bended. Zippers were used on both sides of the pants, and the velcro is attached to the waist band on the right and left in order to prevent the pull-down of trousers when taking off.

2. Jacket and Pants for the Crutch Users

The biggest problem with crutch users is that their armpits get easily worn out due to friction against the armpit. A diamond-shaped gusset is attached to the armpit, to prevent the wearing out. The gusset uses bias-taped seams or french seams. Jacket length and sleeve length are longer than common people's to prevent the clothes lifting up whenever using the crutch. So the length of the

jacket is tailored to be 70cm. Also as another solution, a different color cloth is sewn on the jacket at the sleeve parts to look as if wearing a jacket and a vest. Raglan sleeves, 5cm down from the arm pit, are used to allow smooth movement of the arm. And the length and width of the sleeve cuffs are decided by considering the pleats and the movement of the elbow. Pants have long concealed zippers on both side seams to assist convenient attachment and detachment. And a rubber belt is located on the back waist line to prevent the waist from being tightened, and on both waist lines, buttons are attached to prevent pull-down at the back when using the toilet.

3. Wheelchair Wrap for the Wheelchair Users

This wrap is designed to be warm and water-proof, by using cotton laminated with flannel, and urethane-coated nylon for wheelchair users in rainy and cold weather. The whole appearance of the wrap is a one-piece type, 115cm long, and the upper part of the wrap is like a casual jacket, and

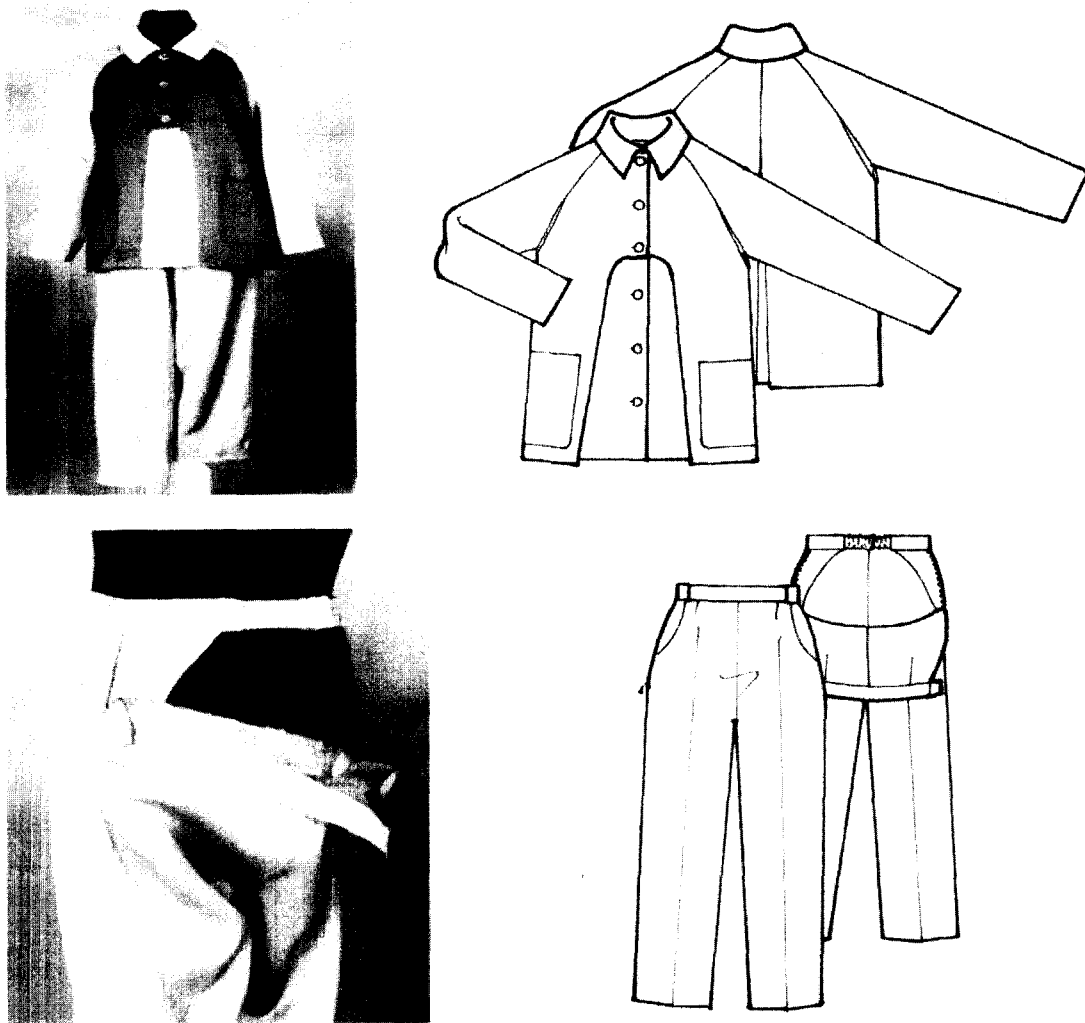


Fig. 3. Jacket and pants for the crutch users

the lower part is a pouch.

On the back, the upper part and the lower part are attached, and the adjustable front part has zippers and both waist have a plastic belt to prevent the garment from opening wide. In order to enable the wearer of the wrap to move the wheelchair conveniently, action pleats are inserted on the back of the sleeves, which are made to be detachable sleeves at the elbow so that the length

of the sleeves can be adjusted. A footstool is designed to wrap the feet and to prevent wind from coming inside when sitting.

The footstool is a square 42cm long, 24cm wide. And a gusset 54cm long and 24cm wide is attached on to it. This gusset is designed as a diamond to connect from the wrap to the footstool making the wearer look as if wearing a long one-piece garment, and zippers are attached from the waist line to the

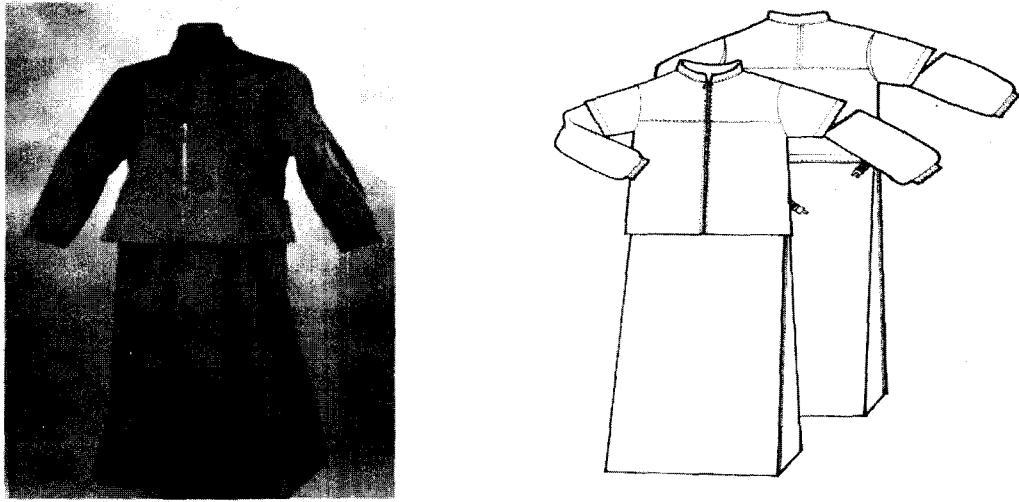


Fig. 4. Wheelchair wrap for the wheelchair users

bottom end so that the garment can be easily taken off.

V. Conclusion

This study came up with garments which considered the functions of various aiding equipments to help the handicapped with their everyday clothes needs. They like the clothes which are convenient to their living and easy to put on and take off. At the same time, they like the functional clothes which give them the sense of fellowship with common people as a member of the society by not making their outward appearance different from common people.

Thus, this study came up with the garments which are convenient to the handicapped in their living and fit them beautifully although their disabled parts vary and they use various aiding equipments. Designs and fasteners are based on the studies already published to reduce the problems occurring when wearing the clothes by taking the opinion of the experimentee fully into

account.

1. The clothes for the wheelchair users focused on the body characteristics and arm movement of the disabled based on their daily life. The jacket is adjusted in its length to solve the problem of the front length becoming shorter and the back length longer. In order to make the movement of their shoulders and arms smooth, action pleats are inserted at the arm hole so that the pleats can functionally make the movements easy. The pleats at the elbow minimize the pull when moving and magnetic fasteners are attached to make the upper part of the sleeve detachable from and attachable to the lower part making the length of the sleeve adjustable and minimizing the wearing-out of the sleeve brim. The adjustable parts have a velcro, which people with disabilities like. As for the pants, the front waist line when sitting should go down 3cm and the back should go up 4cm in order to have a comfortable waist line. At the knee line the pants have pleats on the front and a level dart on the back pleat part.

2. The garments for crutch users focused on the general fitness and the reinforcement of the armpit. When using crutches, the outward appearance looks elevated, so the length of the jacket is designed to be sufficiently long, and raglan sleeves are used. The length and brim of the sleeves are designed to make the wearer look as if wearing a vest upon the jacket and to allow free movement of the arms. To help the pants be smoothly put on and taken off, long zippers are attached on both sides of the seams. A rubber belt is used to make the waist less tightened, and buttons are attached on the waist line of both sides to prevent the back part from going down when lowering the front of the garment.

3. Materials with excellent insulation function are used in making the wheelchair wrap for the wheelchair users for their outings in rains or cold weather. The general outward appearance of the wrap is a one-piece type. The upper part is designed like a casual jacket and the lower part is like a pouch. By considering the daily life of wheelchair users, action pleats are inserted at the back of the sleeves and zippers are attached on the elbow to make the pleats less used (to preserve the pleats) and adjustable. And to warm the lower part of the body, zippers and pads are attached from the knee to the feet. And a diamond shaped footstool is made in consideration of the length of legs and the footstool length of the wheelchair.

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