

# Design and Study of Clothing Structure for People with Limb Disabilities

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**Abstract:** The human body's features are the key to design clothing structure. Between people with physical disabilities and normal people, there are evident differences in their living requirements. Embellishment is needed because of physical distortion; as well as, functionalized design is strongly required to allow more independence in dressing and more self sufficiency in daily activities. Therefore, pattern design should encourage the health recovery, improve living style, and realize personal expectations. The final aim is to allow people with a disability a life of self-respect and facility, and enable them to mingle with family and society to a greater extent. In the past, there had been some clothing designed for people with disabilities. However most of those designs lack aesthetic consideration, and usually focus on the excessively direct aspect of function. Based on the characteristics of human body and movements, particularity for people with limb disabilities, the clothing pattern was analysed by means of real examples. Combining the knowledge of human engineering (ergonomics), textile materials and apparel technology, special modifications were designed in the garment to de-emphasize visual evidence of a person's disability, and strengthen function and convenience to meet the needs of body activities. Clothing designed for disabled people should contain elements of both function and beauty, which can help them rise to the "convenient", "beautiful" and "functional" level from the "inconvenient", "concealment" level. As a result, improvement in the quality of life of people with limb disabilities will be achieved.

**Keywords:** clothing structure, people with limb disabilities, functionalized design, body features, way of motion, embellishment of the body

## 1. Introduction

People with physical disabilities are also an important component of society. According to the statistics of "Data Bulletin and Elucidation of 2<sup>nd</sup> National Spot Survey on Handicapped in 2006", all categories of people with disabilities in China total 82,960,000, accounting for 6.34% of the total population. Among them, the number of those that are limb disabled is 24,120,000, or 29.07%. Physical differences, such as limb disability, often obstruct those in this population from participating in daily activity and communication. One of the reasons for this is a shortage in the marketplace of specially designed, functional clothing, which should be attractive and stylish in a manner similar to the garments used by normal people in embellishment, but at the same time convenient to put on and take off. Therefore, it is both necessary and meaningful to study, design, and develop clothing for people with disabilities, and is also a means of expressing our concern towards them. The specific subjects of this research are people with limb disabilities.

## 2. Integrating with Society: the Ideal State of Living Condition for People with Limb Disabilities

Between the people with physical disabilities and non-disabled people, there are evident differences in the living states. Due to physical differences people with physical disabilities may have psychological characteristics distinct from normal people. In order to maintain the same psychological status and social identity as normal people, the limb disabled tend to depend on prosthetic limbs and outer apparel that conceals those prosthetic limbs, which allows them to enjoy an ordinary social image. For the limb disabled, assistive devices compensate functionally for physical disabilities, and the outerwear contributes to psychological balance and self satisfaction as a powerful medium to integrate with society. Therefore, people with limb disabilities have special needs for the aesthetic and functional structures of clothing, distinct from non-disabled people, and consequently their garments have specific design requirements.

However, specialized clothing for people with

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disabilities is considerable scarce in the marketplace at home and abroad. There are very few garments designed for people with disabilities. Most functions are addressed directly, and embellishment is lacking. In addition, many people with physical disabilities choose ordinary off-the-rack clothing, thus the effect on dressing functions and appearance features are less suitable than on those of other people. What's more, apparel unsuitability usually goes beyond the physical ability of the limb disabled, as appearance without aesthetic consideration may seriously compromise their sense of self-respect. These factors impede their daily work, living, and social communication, and so reduce the quality of life. Thereby, clothing research for limb disabled people should take into full consideration their special physiological comfort and psychological tolerance. In respect to apparel materials, shape, craft, and so on, both beauty and decency are required by way of building confidence and allowing people with limb disabilities to really participate in society and live a relatively ideal life.

### **3. Principles of Clothing structure Design for People with Limb Disabilities**

#### **3.1 Functionality**

Because of the variety of physical disabilities, clothing for people with limb disabilities must above all be practical. Due to differences in amount of exercise and range of motion, clothing shape and structure for people with disabilities should comply with their motion characteristics and assistive devices, and facilitate their actions. Increased and detailed knowledge about the different activities of people with disabilities leads us to design clothing that meets their real requirements.

#### **3.2 Beautification**

Variations in body form often make it difficult for people with limb disabilities to dress well, which in turn strengthen their aspiration for beauty. Their clothing design must not only meet functional requirements, but also should beautify body shape and enhance self-confidence. Research demonstrates that people with limb disabilities have a greater requirement for aesthetic consideration in apparel design than the non-disabled. Their social experience creates a thirst for a fashionable and unprejudiced appearance.

## **4. Research on Clothing Structure for People with Limb Disabilities**

### **4.1 Analysis of Body Features of People with Limb Disabilities**

Due to variations in body feature shape, size, and mobility, people with limb disabilities express changes in relative body area and component parts to different degrees, as well as a large complexity and diversity of body form. According to our research, the body features of people with limb disabilities frequently exhibit one or more of the following three characteristics.

#### **4.1.1 Imbalance of the Body Features**

Some people with limb disability, such as those with a disabled lower limb, are inclined to lose the balance of body feature because of injuries and changes in form. Want of regional body functions will affect the related body area, usually in the form of vertebral curvature, which will result in left-right asymmetry and irregular body shape.

#### **4.1.2 Healthy Body Parts' Compensation for Disabled Body Parts**

Poor blood circulation and lower skin temperature of the body parts of people with disabilities, such as the residual limbs of amputees and the feet of poliomyelitis patients, tend to weaken the muscle functions and lead to muscular atrophy. In order to compensate for the impairment of the affected body parts, the unaffected body parts are forced to endure more pressure and accomplish more functions, and so are usually endowed with more powerful muscles and more flexible joints. For example, people with lower limb disability often have healthier and stronger upper limbs and people with upper limb disability more flexible and powerful lower limbs

#### **4.1.3 Body Features Due to Assistive Devices**

Assistive devices, one of the means to facilitate the daily activities of people with disabilities, can help to support and recover the impaired body parts. However, they can also lead to the evident expansion of relevant muscle groups and serious dependent formation, such as a significant increase in width and