# Impact of body changes in the key measurements used in pattern design and comfort of aged people

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## ABSTRACT

The standards used by clothing manufacturers are defined for younger age group, disabling older people to be accommodated by the apparel industry. These misfit garment problems are generally due to the different body configurations brought by the aging process, causing dissatisfaction and frustration. There are very few garments available that were designed taking in consideration the older population anthropometrics. As such, it is important to understand the various measurements that characterize the senior population in order to produce more form-fitting garments.

The objective of this paper is to perform a comparative analysis between the body dimension of younger and older people. Additionally, it is intended to create a base model for a mannequin that has the appropriate anthropometric dimensions to accommodate the older population.

## INTRODUCTION

With the advancing of age, the human body becomes different than it was at a younger age. Despite the clothing size worn by a person could be the same throughout a lifetime, the way that it fits is most certainly different. A size 36 fits differently a person who is 40 years old than a person that is 75 years old.

Clothing fit is generally affected by age-related changes in the body. Some studies showed that the difference in body measurements of the elderly include increased girth measurements in the bust, waist, abdomen, and hips; increased weight and decreased height; and lower bust lines and rounded backs (Ashdown and Na, 2008).

As such, having knowledge about how the human body evolves throughout the years is very important. Further, the body characteristics and measurement of older people should be taken in consideration to the design of clothing.

This study intends to compare the measurements of some body parts in older people and in younger people. The main purpose of this comparison is to produce a base of knowledge to be used in the development of basic pattern design that reliably describes the body shapes and posture of different ages.

## LITERATURE REVIEW

Over the years many studies have been conducted in order to observe the body measurements of older and younger women and to quantify the postural variations that affect clothing fit (Goldsberry et al., 1996; Lunn, 1983; Patterson & Warden, 1984).

Design well-fitting apparel for the senior population segment is intrinsically dependent from an increasingly important understanding of the specific body proportions and details of the posture changes resulting from age-induced anatomical and physiological changes. Thus, to create apparel goods that can better accommodate this population it is important to use a database that accurately quantifies the different body shapes and dimensions of mature individuals and to understand the impact of the changes that occur with age (Kohn, 1996).

Ashdown and Na (2008) also emphasize that the shoulder and neck area are determinate measurements since much of people's clothing is suspended from this area, compromising the balance and fit of the garment. In their study, despite the limited number of subjects, they found that some significant differences between older and younger women in both the left and right sides of the body for angles that define the forward roll of the shoulder.

There has been an increasing awareness of the clothing fit for the senior population problem, since many mature women and men have expressed their displeasure with the fit of ready-to-wear garments (Goldsberry et al., 1996; Woodson & Horridge, 1990). The older population usually goes through a tedious process of trying on many sizes in the search for the appropriate fit.

## METHODOLOGY

The selected subjects for this study were mothers and daughters and fathers and sons that have similar body shapes. This choice was based on the assumption that the body types between closely related people would be much more alike than if the comparison was made between random people.

To perform the comparison, a set of body dimension was selected. These measurements were:

1. Hip circumference
2. Waist circumference
3. Bust circumference
4. Shoulder length
5. Back width
6. Neck base circumference
7. Waist to shoulder frontal length
8. Waist to shoulder back length

Besides comparing the anthropometrics of the subjects, the selected measurements were also used to create the basic body patterns for both groups of participants. A garment was then produced and evaluated in terms of fitting and comfort.

All the measurements were taken using a three-dimensional body scanner (Microsoft Kinect) – Figure 1. This makes it possible to take measurements that would be very difficult to take using the traditional method of measuring directly on the body.
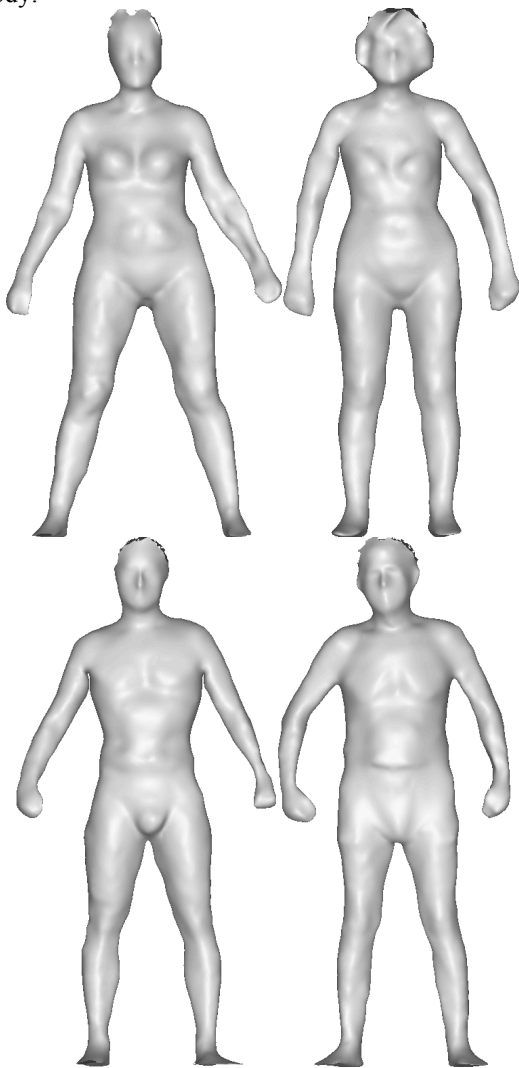


Figure 1 – Scans of some participants

Each subject was scanned five times to ensure reliable and precise data, without tiring the study participants or the technician doing the measurements. Additionally, using 3D scans also facilitates the process of comparing both the several sides of the body and the various test subjects.

## CONCLUSIONS
This paper will provide the necessary data to create well fitted garments for the older population, reducing the frustration in the selection of appropriate clothing, improving their comfort and aesthetics with a better fit.

## KEYWORDS
Garment misfits, older population, anthropometrics.

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