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A Study on a Briefs Design Development of the Elderly Women(Part 2) -Focusing on Lower Body Somatotype Classification and Discrimination of Elderly Women in Jeonbuk-

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I. Introduction

Everyone experiences growth and senility. With aging, the symptoms of physical changes take place. In particular for the female, the physical changes are notable like bending back, obese abdomen and hips, sagging breast and thinner legs and arms and so on. Their somatotypes are varied. For this age, wearing the fit clothing is so important that it may give the female seniors an effect of the psychotherapy, by providing the self-esteem, the self-expression and the increasing sense of belongings as well as the functionality.

The underwear is especially significant as it contacts the skin firsthand, and its size, shape and performance are crucial in respect of the senior's activity and physiology. A pair of panties the female seniors essentially have on need to be designed to be soft and anti-irritant and improve the physical conformity to the changing body shape with age, in addition to general requirements like maintaining the cleanness with sufficient absorptiveness of secretion and sweat (Do Wolhee, 1994).

But the panties on the market have the common size structure applied to all ages and are regarded as inconvenient for the most of the female seniors characterized physically with thick waist and pot-belly. So the physical characteristics of the female seniors should be reflected in the design of the panties to promote the satisfaction with the products.

This study is purposed to present the primary data for the development of the panties for the female seniors. For this, the lower bodies are measured firsthand, and the constituent factors are made up on the basis of the measured result. The body types of the female seniors are classified to determine the characteristics of individual groups for the purpose of developing a design for the panties with the high fitness.

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Ⅱ. Measuring Method and Procedures

1 Participants and Measuring Method

The measurement has been conducted through direct contact with the seniors ranged from 60 to 79 years old in Jeonbuk to identify the body type of their lower bodies.

2. Measuring Positions

The measurement of the lower body has been implemented, by being divided into 30 parameters including 9 for height, 8 for breadth and depth, 8 for girth and 5 for length and weight based on the report on the national standard body positions and precedent studies, which enables to analyze the lower body type of the female senior and is essential to developing the design of the panties.

Ⅲ. Result and Conclusion

1 Analysis of the Measurement

The participants in this study had 142.0cm of the height, 77.50cm of the waist girth, 82.1cm of the abdominal girth, 85.2cm of the hip girth and 44.5kg of the body mass in average. These figures are corresponding to the studies of Lee Soyoung (2004) and Nam Yoonja (1999) as to the female seniors and show that the hip size is decreasing with age rather than the abdominal size.

2 Constituent Factors of the Lower Body

The factor 1 has something to do with the breadth and height including the girth, the breadth, the body mass and the total crotch length related to the projecting abdomen. The loadings of the body mass, the hip girth and the abdominal girth are high, which proves that the obesity degree of the abdomen and the hip is a scale for the physical obesity. The factor 2 is mainly related to the height, i.e. the vertical size of the lower body. The factor 3 and 4 are marked as the iliac spine height and crotch height respectively.(Table 1)

3. Result from Cluster Analysis of the Lower Body

As a result from the cluster analysis of the female senior's lower body, the cluster is classified into 3 somatotypes. For the first type, all the vertical sizes of the lower half of the body including the height are large, and the scales for the obesity like breadth, girth and body mass are high. So the somatotype 1 is called "tall and fat type". The second somatotype has a mean body as it is approximate to the average figure in respect of the height and the scale for the obesity including the girth and the breadth. In particular, the difference between the hip and the waist girth is so small that it appears to have no curve on the line. The somatotype 3 is the

〈Table 1〉 Constituent Factors of the Lower Body

Item \ Component	Factor 1	Factor 2	Factor 3	Factor 4	(h^2)	Characteristic
Waist breadth	.833	- 103	.197	-.278	89	
Abdominal breadth	.894	-0 01766	-0 09746	-.129	93	
Hip breadth	.731	.162	-.310	-.323	.82	
Maximum lower body breadth	.855	0.02154	-.292	-.231	.92	
Waist depth	.785	-.461	.245	.145	.94	
Hip depth	.679	-.536	-.159	.108	.85	
Abdominal depth	.708	-.464	264	.200	.92	
Maximum lower body depth	.696	-.529	-0.02254	0.088101	.91	
Waist girth	.868	-.132	.286	0.01316	.96	Length, breadth
Abdominal girth	.832	-.157	161	202	.86	
Hip girth(back protrusion)	.918	0 05114	0 0001940	.124	.93	
Hip girth(side protrusion)	.897	-0.04070	0 005206	.154	.85	
Thigh girth	.809	.177	-.277	- 133	.84	
Knee girth	.781	235	-.197	0.02.283	.82	
Calf girth	.812	.276	-.135	0.09.004	.88	
Minimum leg girth	.780	-0.03.477	-.331	.150	78	
Total crotch length	.783	.253	-.135	0.07.764	.83	
Body mass	.955	.143	0.08.385	0.06 010	.95	
Height	.504	.775	.222	0.05.066	.91	
Back waist height	.255	.546	.382	.249	.83	
Hip height	0.06155	.621	.612	.137	.65	
Nipple height	.430	.693	.175	- 172	.85	Height
Front waist height	.460	.757	.131	.188	.78	
Navel height	-.221	.782	-.215	-0.02711	.86	
Knee height	-.419	.570	.171	.248	.91	
Waist to hip	-.296	.556	-.486	-0 03 887	.68	
Iliac spine height	-0 03536	.349	.668	- 553	.75	Iliac spine height
Crotch height	0.03026	.427	-.366	.631	.83	Crotch height
Eigenvalue	13.97	5 47	2.66	1.57		
Variance(%)	45.06	17.65	8.58	5 05		
Cumulative(%)	45.06	62.70	71 29	76 34		

smallest among the three types. The scale for the obesity like the breadth, the girth and the body mass is the smallest as well, which is labelled as "small and thin type".

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