

# A Study on the Measurement of Korean Men's Head for Headgear Pattern Making

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## I. Introduction

People's head not only has the structures of complication and delicateness because they are directly related to the faces as well as skulls, but also it is very important part, which is directly related to life. Therefore we need to identify the accurate measurement and shapes of these parts to design safe and useful industrial products such as helmets.

However previous studies provided the measurement of restrictive parts only. Therefore they could not provide detailed information on head shape of Koreans.

Therefore the purpose of this study is to set measurement parts which are important to identify the size and shape of the head in order to produce tightly fitted hats, and to identify detailed sizes and the major factors of head shape classifications.

Through this study, we will be able to systemize head measurement materials that can differentiate Korean's head from other people's and can use the results in developing head shape models according to Korean's head shape by selecting major head parts needed to identify the sizes and shapes.

## II. Methods and Procedures

The subjects were 289 males in the age group of 18 to 35. It were measured through the direct measurement method by selecting 67 measurement items.

The measurement standard points were set as 22 parts referring to National Antropometric Survey of Korea, Human Body Dimensions Data for Ergonomic Design of Japan and Antropometric Survey of U.S Army Personal of USA.

We measured total 67 parts including new 6 parts additional to the conventional measuring parts.

We produced and used a head measurement assistant tool to maintain the measurement posture of the head and to measure vertical and horizontal distance in the head.

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Materials were analyzed by SPSS Ver.10 and technology statistics and factor analysis were performed according to the agenda.

### III. Conclusions and Discussion

1. Based on the previous studies, 67 parts of the head including newly designated points were set as the measuring points. Looking into them in details, 15 parts from circumferences and the arc length, 16 parts from vertical height, 8 parts from straight length item, 17 parts from horizontal distance item, and 11 parts from thickness and breadth item. The measurement parts that the researcher set newly were 2 parts in vertical height parts, which are the vertical height from vertex to the inion and from vertex to the back head end point. From the horizontal distance parts, the horizontal distance from the inion to vertex and from the inion to the back head end point were two points that were newly inserted. From arc length items, 2 parts such as the glabella to vertex arc length, and from vertex to the inion arc length. Newly inserted points were 6 in total

2. Average measurement value of major head parts was as follows; head circumference - 57.54cm, head height - 22.76cm, head thickness - 19.20 cm, head breadth - 16.10cm, bitragus breadth - 14.37cm, gonion breadth - 11.64cm, bitragus to vertex arc length - 39.50cm, glabella to inion arc length - 30.57cm, vertex to glabella height - 9.18cm, vertex to trignon height -13.96cm, vertex to the end point of back head height - 17.44cm, menton to crinion length - 19.75cm, sellion to menton length - 12.04cm, inion to trignon distance - 10.72cm, inion to menton distance - 18.71cm, inion to the end point of back head distance - 3.68cm.

Comparing these measurement with the results from National Citizens' Physical Status Report, we could see that they became taller but the head length became shorter, which made the relative total head height increased. We could see that head shapes were changed from wide shape to thick shape, which is rather western style.

3. An attempt was made to conduct factor analysis of the measured region of the head in male adults. Here, this study drew the facial vertical size factor Factor 1, the head and facial horizontal size as Factor 2, the circumference and width item as Factor 3, the factor representing the form of head height as Factor 4, the factor expressing the proportion of the facial form as Factor 5 and the factor about the frontal and back head form on the plan of the middle as Factor 6. It could be found that the vertical and horizontal regions of the head was the important items as well as the head circumference that became the important criterion in making the hat to identify the head form.

It could be said that this study has its significance in measuring the region of the detailed items of the head and presenting its results as data and systematizing the head types of Korean people. The presented head model and measurements by type based on these measurements of the head region could be practically used to raise the workmanship fitness of the closely fit hat.

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