1. Introduction

An ultimate comfort for Human being has been studied and developed for decades. Yet, human comfort in sleep has been merely discussed. According to Kusunoki, Comfort is a complex phenomenon and experiments investigating it have not shown any decisive results to date and a research methodology for assessing and interpreting comfort has yet to be set up. A pillow, one of the most significant subjects in human-sleep required to be developed. Unlike those ordinary pillows, this paper is discussing over the entirely new concept of pillow called ACP, Air Cell-type Pillow that has never been introduced yet. There is evidence to support recommendation of rubber pillows in the management of walking cervical pain, and to improve sleep quality and pillow comfort. This new concept of study in pillow was conducted on the relation between an ultimate human comfort in sleep and both the biomechanical and anthropometrical characteristics based on practical data of 30 participants.

2. Methodology

2.1 ACP Development

Fig. 1 is showing the ACP that is composed of 77 discrete air cells. Each of the air cell distribute a pressure exerted from human body to larger area. In order to design the optimal shape, an FEA and Central Composite Design from Madymo and Minitab, respectively has been carried out. Fig. 1 Air Cell-type Pillow Design. Total size is 638x426x100/90/65 (in W x D x H.)

Fig. 2 Basic Setting.

2.2 Data Acquisition

The total of 30 healthy subjects were both male and female volunteers, aged from 25 to 53 in this experiment. The purposes of this study are on the anthropometric and demographic characteristics of the participants, the objective pressure di
distribution at the cervical spine area, property of the optimized ACP, and comparison over various types of pillows such as memory form type and ordinary feather type pillow. The ACP has divided into 7 regions (4 individuals, 2 upper and lower parts and 1 as a whole) as Fig. 2 to measure the contact area, pressure, peak pressure, and pressure gradient. In order to make the cervical curvature, the ACP has two discrete neck support parts that help to make the Cobb angle as Fig. 3.

3. Test Results

Fig. 3 shows the data collected from a number of different trials and comparison. The vast majority of the data from all of the participants showed that ACP has the lowest peak pressure level that makes the cervical curvature (Fig. 4) and best comfort feedback with a range from 0.4 to 0.7 compressibility.

4. Conclusions

In this research, there was a significant difference in pressure, peak pressure, and pressure gradients over different types of pillow samples. Only the ACP showed the cervical curvature that directly related to the best comfort feedback from the most of the participants.

Reference