

USABILITY EVALUATION OF CONTOURED PILLOW THROUGH INTERFACE PRESSURE ANALYSIS OF OCCIPITAL AND CERVICAL VERTEBRAL AREA

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● INTRODUCTION

Sleep occupies one third of time in human beings' life. Therefore, the quality of sleep is very important issue to be related directly to the health. One of the ways improving the quality of sleep is the proper sleeping posture. Wrong sleeping posture is the cause of pain, snoring and fatigue etc.. In previous studies, sleeping posture maintaining the natural cervical vertebral curve was recommended, for this reason several types of pillows have been developed to maintain the proper posture of head and neck. In this study, we evaluated sleeping posture when using hard, soft and contoured pillows through analyzing interface pressure of occipital and cervical area.

● METHOD

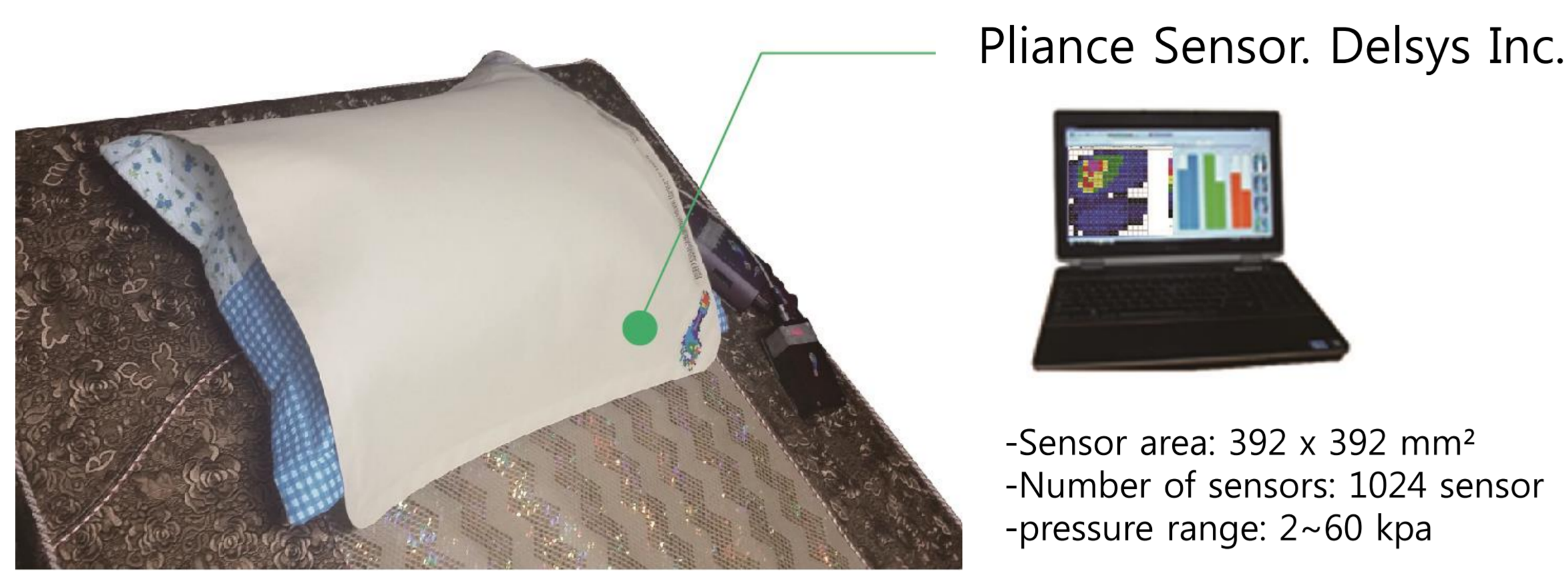


Figure 1: measurement equipment

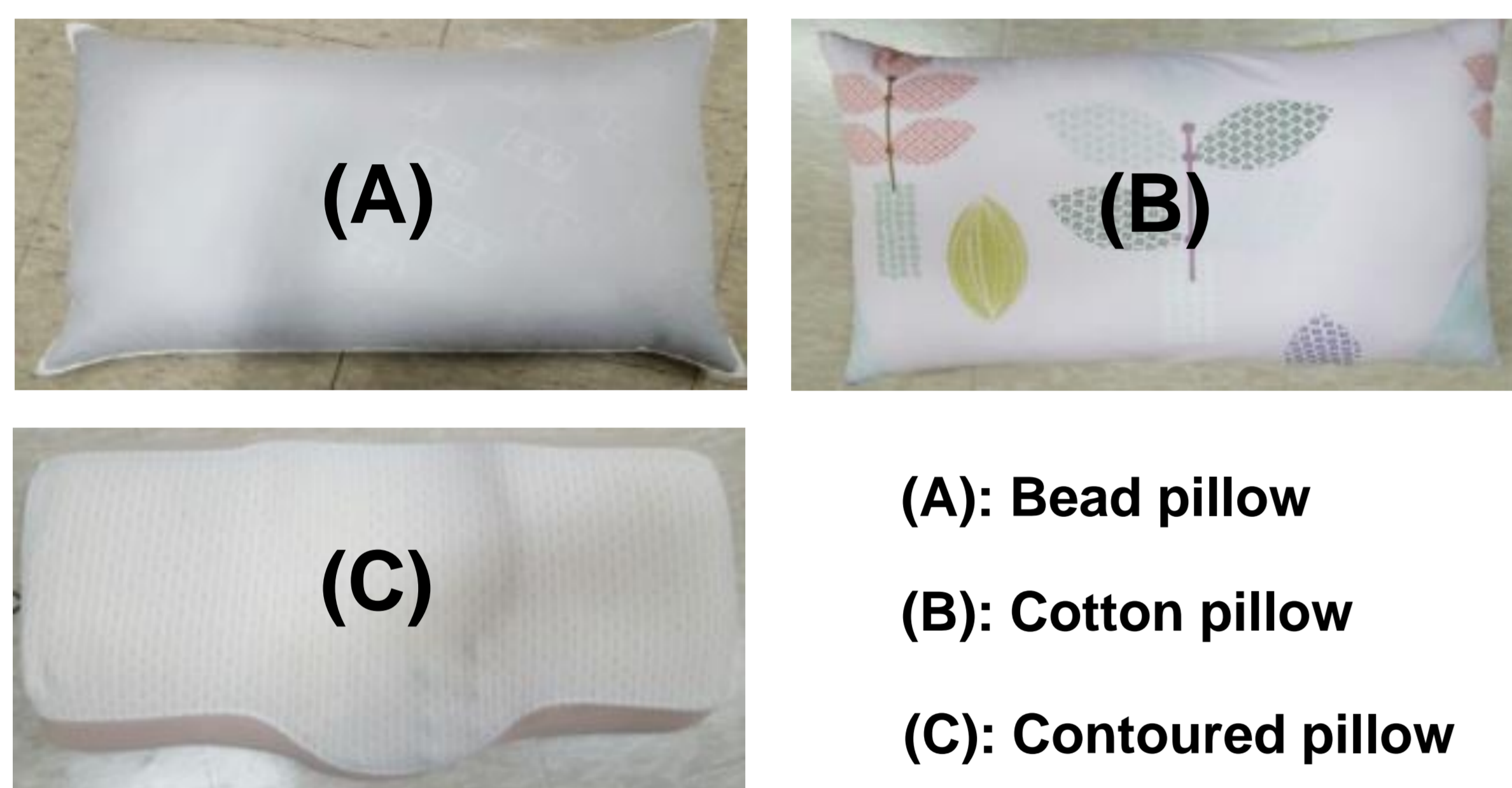


Figure 2: Independent variables
(A): Bead pillow, (B): Cotton pillow, (C): Contoured pillow

● RESULTS

Variable (Unit)	Area	Bead Pillow	Cotton Pillow	Contoured Pillow
Contact Area (m ²)	O.A.	0.012 ±0.001	0.016 ±0.003	0.017 ±0.002
	C.A.	0.013 ±0.004	0.017 ±0.005	0.018 ±0.005
Peak Pressure (kPa)	O.A.	7.99 ±1.46	4.40 ±1.09	4.77 ±1.53
	C.A.	6.26 ±2.65	6.07 ±1.16	6.99 ±1.39
Mean Pressure (kPa)	O.A.	2.55 ±0.2	1.42 ±0.16	1.37 ±0.22
	C.A.	1.79 ±0.59	1.45 ±0.15	1.82 ±0.24
Force (N)	O.A.	29.3 ±3.79	22.4 ±4.56	23.2 ±5.42
	C.A.	23.9 ±13.4	23.6 ±6.65	33.0 ±12.3

Table 1: The results of interface load(O.A.: Occipital Area, C.A.: Cervical area).

● CONCLUSION

Sleeping posture using contoured pillow was confirmed to be distributed interface load concentrated on occipital area to cervical area in Table 1 and Figure 4. Effectiveness of contoured pillow about supporting cervical and maintain cervical curve was able to validated by distributed interface load pattern and result.



Figure 3: Masking area on the experiment ((A): Occipital area, (B): Cervical area)

● Subjects

Five healthy males (32 ± 2.10 years, 173.4 ± 5.2cm, 80.0 ± 12.6kg) and five healthy females (31.6 ± 2.0 years, 164.2 ± 5.3cm, 53.5 ± 4.5kg) were selected to participate in this study.

● Measurements and data analysis

The subjects were placed in the supine position, as shown in Figure 3. The interface pressure of 3 type (bead, cotton and contoured) pillow was measured by pliance data acquisition system, Novel Inc. The main load areas were expected in the occipital and cervical areas, shown in Figure 1 as areas (A) and (B), respectively. The measured peak pressure, mean pressure, contact area and force in these areas are presented in Table 1.

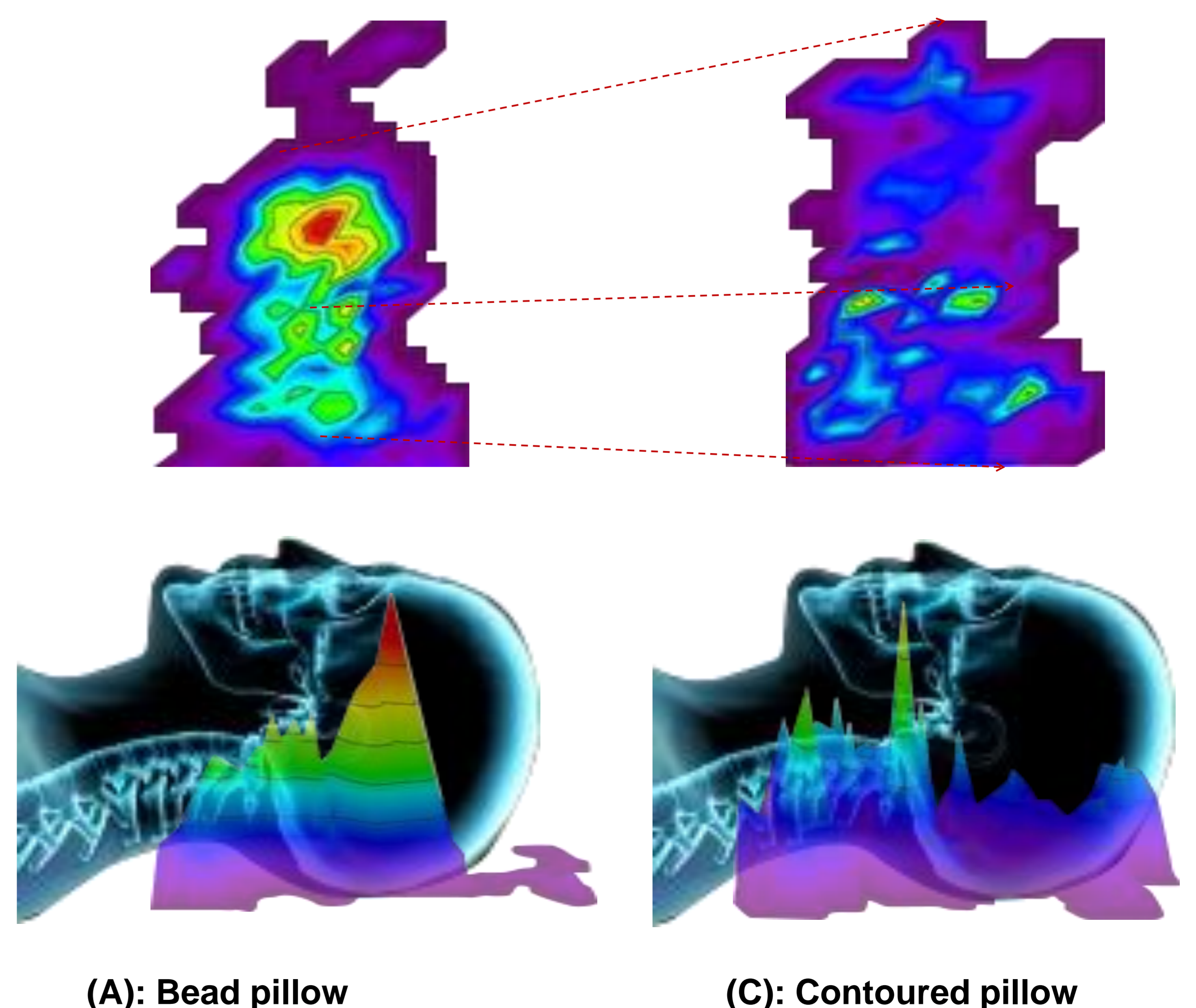


Figure 4: Comparison of peak pressure (some subject) between bead and contoured pillow